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AND

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THE VARIOUS DEPARTMENTS

OF

PAINTING, SCULPTURE, ARCHITECTURE, HISTORY, BIOGRAPHY,
ART-INDUSTRY, MANUFACTURES, INVENTIONS AND DISCOVERIES, LOCAL AND DOMESTIC SCENES,
ORNAMENTAL WORKS,
&c. &c.

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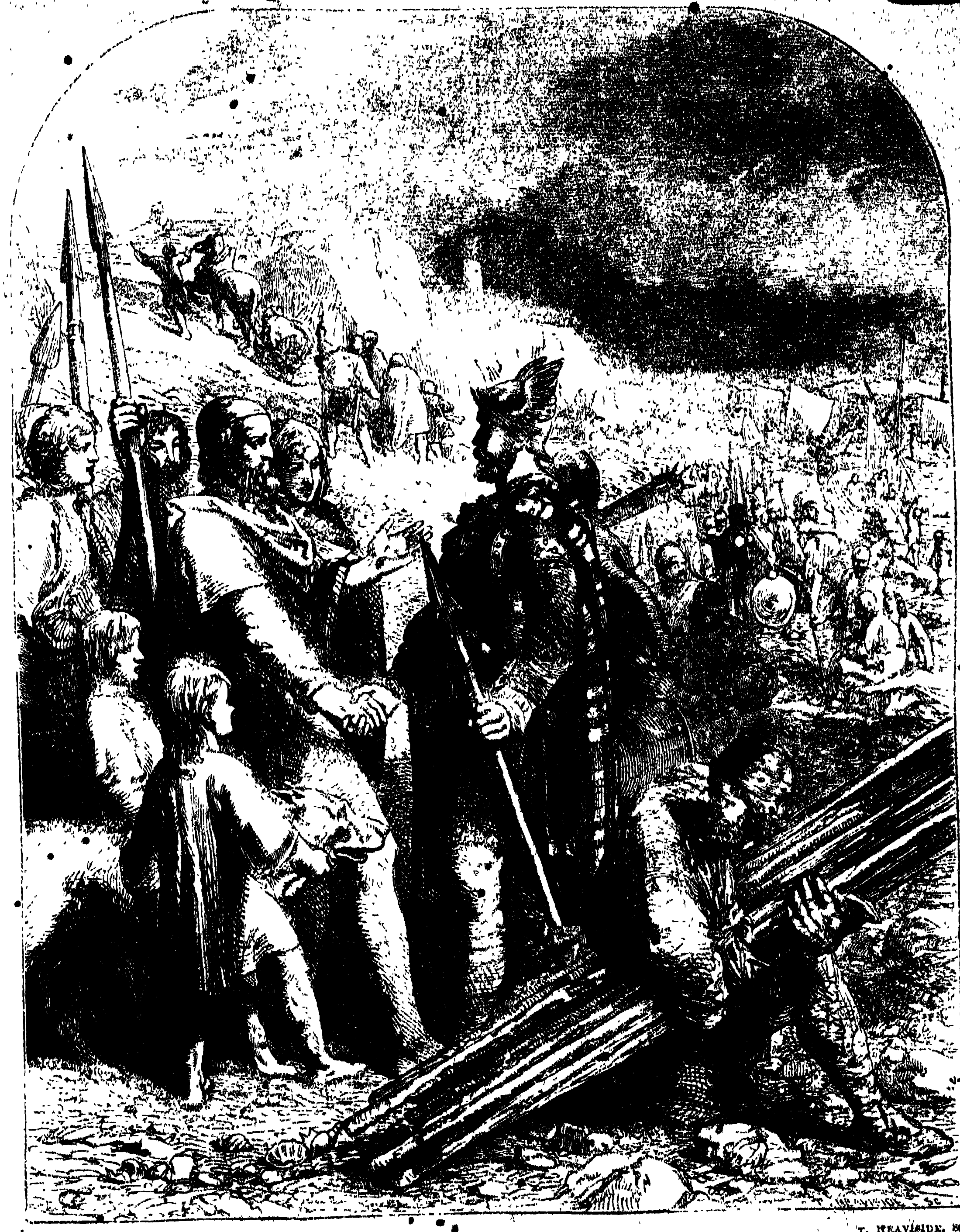
THE LANDING OF THE SAXONS IN BRITAIN.



DRAWN BY J. GILBERT. T. HEAVISIDE, SC.

Hither came from eastern shores
The Angles and Saxons over the broad sea—
Fierce battle-smiths—and Britain sought;
O'ercame the Welsh, most valiant earls,
And gained the land.

OLD SAXON POEM.

HISTORICAL EVENTS.

THE LANDING OF THE SAXONS IN BRITAIN, A.D. 450.

It is a thousand years and more since the wretched Britons "sent their groans to the thrice-appointed Consul, Aetius," beseeching him to protect them against the fearful inroads of the painted savages of the north. "The sea drives us back upon the swords of the barbarians, and the swords of the barbarians," said they, "drive us into the sea. Come over and help us, ere we perish!" But the Consul had other and more pressing dangers to guard against, and dearer interests to attend to, and the Britons were left to their fate.

In the forests of lower Germany a hardy tribe then dwelt, whose prowess was acknowledged far and wide, and whose barks rode triumphantly over the stormy seas of the north, by the rude waves of which many a mightier navy had been dashed to atoms. This fair-haired, blue-eyed race, had spread the terror of their name along the coast of Gaul, and left homes desolate and mothers weeping on the far-off shores of Spain. Their wild war songs were often heard with fear and trembling over the roar of the storm, and their ships were often seen bearing their warriors to plunder, havoc, and desolation, through the howling tempest. These were the Saxons, and these were the men whom the Britons besought to aid them.

They came with 1,600 men, and landed in A.D. 460 in the Isle of Thanet, under the command of two brothers, Hengist and Horsa, as tradition tells; but it is now generally and more correctly believed that the story of the two brothers is a mere myth, founded on the figure of a horse borne on their standard. They immediately marched against the Picts and Scots, and often was the white-horse flag borne triumphantly through many a bloody field. They demanded land as the reward of their services, and at last took possession of the whole island, and drove the Britons to the extreme west and south-west. New bands of adventurers arriving, they established seven kingdoms, known as the Saxon Heptarchy, which were at length united into one under Egbert. The after history, until the invasion of the Danes, was one of peaceful progress. With their severe but successful struggles against the latter all are acquainted.

Attracted by the beauty and fertility of our country, these northern tribes came—as the engraving shows—in their capacious, but not unwieldy war-ships, armed with weapons of steel, while their champions wielded with fatal energy their ponderous and iron-spiked clubs. Their descent on our shores, commenced in adventure and continued in conquest, originated and established the Anglo-Saxon race, which, rising from the shores of Kent, spread itself speedily over the length and breadth of the land. The Normans softened the ruggedness of the people, and gave a polish to their surface; and we are now the result of this fusion, and that during successive periods,—just as the British Government is a mixture of elements and a growth of ages.

The Anglo-Saxon race, nursed within the boundaries of a narrow island, has not only been receptive, but, to an extraordinary extent, diffusive. Every wave that has touched its coasts has wafted onwards an impulsive influence that has been felt throughout the habitable globe. As the seeds of Anglo-Saxon vitality have been committed to them, they have sprung up even on the far-off sands and rocks. The pitching of a tent has been the precursor of a town, and the sea-coast station has extended itself into a continental metropolis.

Many pages of history are filled with the triumphs of the Anglo-Saxons. They have penetrated the vast forests of America, and peopled with constantly increasing millions the western hemisphere. They have passed the great wall of China, and to them has been surrendered the immemorial sceptre of the East. Their colonies are boundless regions, the seats of incipient empires of gigantic strength, where ten times the population of Britain may subsist in contentment and affluence. Without pretending [illegible] name of a military people, they have acquired a dominion [illegible]r than that of Alexander or Aurelian. The pen of the his[illegible]n, in future ages, will have to trace their subsequent progress [illegible] destiny.

It must for ever form a subject for triumph and self-gratulation, that a little island like our own, peopled by a handful of hardy men, the descendants of a few warriors from the swamps of the north, should not only have built up a great constitution at home, but have made their name famous all the world over in "arts, in arms, in story." The people of England must not attempt to claim descent from the horde of adventurers who fought beside William the Bastard on the downs of Hastings, and who, forgetful of their antecedents, lorded it ever since in the heritage of the conquered people. It is only the great lords and "county families" of our day, who derive their origin from this impure source. The men who fought beside Harold, and who ceased to fight only when fighting was useless, but who neither betrayed nor repented; the faithful few who held out in the marshes of Ely, and wept over William Longbeard in the streets of London; the serfs, the yeomen, and the sellers of broadcloth, who sung the praises of Robin Hood and Little John, and loved to hear of the exploits of outlaws bold in the "merry green wood;" the irritated peasants who rose under Wat Tyler and Jack Cade, and marched upon the capital, shouting "No haughty lords! no hollow-hearted bishops!" and singing,

"When Adam delved, and Eve span,
Who was then the gentleman?"—

these were the ancestors of the Englishmen who have peopled the forests of the far west; who discovered the new world of Polynesia, and have colonised, peopled, and subdued it; who have conquered the wide plains of the East, and gathered in all the riches of the El Dorado of the ancients; who are found everywhere over the globe, working, reading, writing, travelling, speaking; who fought at Cressy, at Agincourt, at Trafalgar, and Waterloo.

Ours is a great mission, and we should be proud of it, and careful how we fulfil it. It is not like that of the Romans, to conquer only—"parcere subjectis, et debellare superbos." It is not to rule only, but to civilise, to enlighten, to raise up the people dependent upon us to our own level. Was there ever such a field for a work so glorious? In Asia our generals reign over 98,346,842 men, whose past history is the romance of greatness, but whose civilisation is stationary, and whose morality is degrading. To these it is our duty to teach the lessons of Christianity, progress, and order; to enable them, by the aid of European science, to take advantage of the almost inexhaustible resources of their country, and attach them to our Government by the ties of love and interest rather than the stern persuasion of the sword; to instil into their minds a correct estimate of the value of truth and peace by the force of our own example.

In Australia we have a territory as large as the whole of Europe, possessing a fertile soil, a fine climate, and an inexhaustible supply of mineral wealth. Here we are laying the foundation of an empire which will in all probability form the Britain of the future, when one of its roving tourists, "sitting on a broken arch of London-bridge, shall sketch the ruins of St. Paul's." The stability, security, glory, and usefulness of this scion of our race will depend, in a great measure, upon how we foster and educate its youth. By inculcating, as far as lies in our power, habits of order, obedience to law, self-reliance, and self-government, we perpetuate our name and memory to all time to come. But by cramping its energies, corrupting its morals, keeping it in a state of etiolation or prolonged childhood, we may sow the seeds of ruin and misfortune.

In Africa a territory is opened up to us which has hitherto defied the efforts of the white man to penetrate it. It will be a glorious era in the history of Britain when the children of Ham shall sit down in peace and civilisation, and declare that to her they owe their freedom, their progress, and elevation. Let us take care that no false pride, no hankering after bloody conquest, defer "a consummation so devoutly to be wished." Let us shew ourselves rather the dauntless apostles of the old Gospel, bearing beneath its wings a civilisation which has grown larger and more enlightened through the lapse of a thousand years.

When we then reflect upon what our race has done—"the battles, sieges, fortunes, it has passed"—and when we look forward with unshaken hope to all that it has yet to achieve—when we call to mind the long roll of great men whose mighty voices, sounding through the portals of the tomb, and the mist of years, "still seem to bid England be of good cheer and bid defiance to her enemies"—who can fail to recognise the vast and overwhelming importance of the event known as the LANDING OF THE SAXONS?

ARCHITECTURE.

THE GRAND CHATEAU OF VERSAILLES.

THE very mention of Versailles calls up a thousand reminiscences of the reign of the Grand Monarque—of gay ladies, talented and witty, bewitching in their charms, and pretty in their letter-writing; of gentlemen who spent their days, and often their nights, in boudoirs, and employed all their leisure hours in the invention of *bon-mots* and quaint compliments, to win the favour of their mistresses; of *bals, soupers,* and gallantry and intrigues. The sun and centre of this system of lively folly was Louis XIV. himself—he who comprised the whole state in his single person. And undoubtedly he was superior to all around him. His genius as a ruler and statesman in some measure redeemed the follies of his private life. He made France the most powerful kingdom in Europe, and her court the model of all others in dress, in manner, and in language. But he, too, was the first who successfully endeavoured to banish all serious thought, all earnestness of purpose, from the French soil; and lest his courtiers should trouble their heads about state affairs, he made their lives one long fête. But it was befitting that so joyous a company should have more splendid halls to revel in than the mansions of the old French kings. Louis therefore determined to erect a palace worthy of the greatness that crowned him, and of the *galants* and *jollies dames* who danced minuets with stately paces through the night, and rode briskly to the chase in the morning.

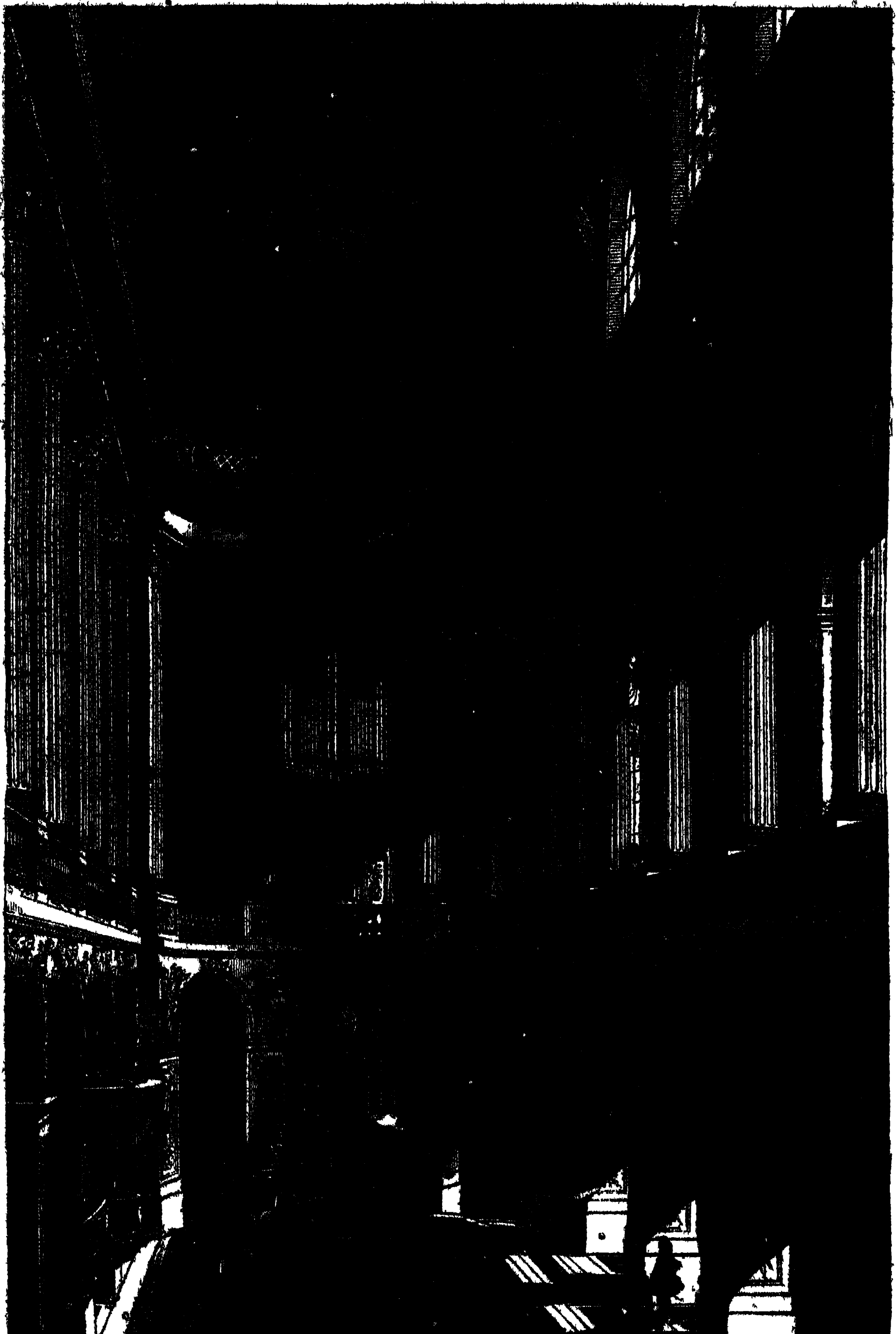
The desire which Louis felt to build the new palace upon the site of an old hunting-lodge erected by his father, in some measure marred the symmetry of his design. Not only was the situation in many respects unsuitable, but in the attempt to adopt the new building to the old one, the vestibules were badly placed, and the staircases, except the marble one, do not by any means harmonise with the richness and vast extent of the edifice. Outwardly, too, the chateau is wanting in effect. There is not the loftiness nor elevation which is always necessary to impress the mind with the idea of grandeur and magnificence. Nevertheless, on the side facing the town, the disposition of the three courts, each gradually diminishing in size, produces a very agreeable perspective. The third, which is called the Marble Court, seems a sort of *sanctum*, around which are grouped the private apartments of the sovereign. The great *Galerie des Glaces*, and the Halls of Peace and War, form the two sides of the building adjoining the garden. The gallery is now divested of all furniture, and forms a vast public promenade. In days of yore, the antique furniture, and the curiously-wrought ornaments of gold and silver, and the immense number of valuable models of every kind with which it was profusely ornamented, formed the delight of every eye that beheld them. The twenty-seven paintings which adorn the ceiling are by Lebrun, and are all scenes in the life of Louis XIV. The apartments of the king and queen are to the right and left of the gallery. The decoration of these rooms is in a style of unequalled splendour. The rarest marble, gold, and bronze, meet us at every point. The paintings were all executed by Coypel, Audran, Delafosse, Lemoine, Philippe de Champagne, Jouvenet, &c. They contain also a large collection of the works of the old masters—of Raphael, Peter of Cortona, Paul Veronese, Guido, &c. One cabinet is specially appropriated to ancient relics in bronze, precious ornaments, &c. There is a magnificent collection of medals; and amongst the cameos that of the apotheosis of Augustus, at present deposited in the Bibliothèque National. All these are now open to the inspection of the public.

The chapel, which is badly situated in relation to the rest of the building, is near the royal apartments. Its general arrangement is made upon the same principle as the chateau itself—that is, the lower story forms a pedestal for a magnificent colonnade, supporting an upper gallery on a level with the private apartments of the sovereign. The ceiling is divided into three compartments, on each of which are paintings by Jouvenet, Coypel, and Delafosse. The *toute ensemble* of the building is, however, imposing beyond measure; and of all the religious edifices of the seventeenth century it is, perhaps, the one in which the elements of ancient architecture have most successfully contributed to the production of *effect*, in the best and most comprehensive sense of the word. The erection of the chapel was commenced in 1699, and was finished in 1710, only five years before the death of Louis XIV.

It must form a subject of regret that the style peculiar to the old French chateaux—pavilions surmounted by elevated roofs—has not been preserved in Versailles. In the latter, the continuity of horizontal straight lines, extending from one extremity to the other of the façade overlooking the garden, produces an appearance which fatigues the eye by its uniformity. If it were not for the projection of the central or principal building over the wings, there would be nothing to indicate the quarter appropriated to the private apartments of the royal family.

Although the decorations of the interior are marked rather by great richness than chasteness and purity of design, it must be confessed that the various artists who were employed in this great work have infused into every part of it wonderful harmony and unity of aim and execution. The whole building is a fair emblem of the power and the character of the French nation in its best days: but in every room, in every painting, almost in the articles of furniture themselves, we find some memorial of the master mind at whose bidding it rose from the ground. But it is in the gardens and orangery that art displays one of its greatest triumphs. An arid, barren soil, without water or any other natural advantage, has been converted into a paradise worthy of fairyland. Whichever way we turn, all is marvellous, all is magnificent beyond measure. Imagination can scarcely conjure up a greater variety of the picturesque and beautiful than meets the eye in every corner of the park. The numberless marble statues that people the shady groves, the vases, the fountains, the groups in bronze, the water playing in a thousand different devices, form a scene of unequalled splendour, and inspire the spectator with a feeling of enchantment. The palace overlooks the park, and crowns the terraces which ascend on every side. The orangery is in the centre of all, on an elevation, which is reached by two flights of steps erected upon a gigantic scale. The total expense of the erection and decoration of Versailles was 169,148,319,180 francs.

Jules Hardouin Mansart, who took so prominent a part in the execution of the great works set on foot in the reign of Louis XIV., and exercised so great an influence over the French architecture of the seventeenth century, was born in 1645. His father was "cabinet painter" to the King, and his mother was the sister of Francois Mansart, another great architect. His first work was the Chateau of Clagny, which Louis XIV. caused to be erected near Versailles for Madame de Montespan, one of his many *chères amies*. Mansart was then only thirty-one years old, but he was already celebrated. He was employed in the erection of the stables at Versailles, which stand with so imposing an appearance at each side of the great avenue leading to the chateau. But the chateau itself was his great work. When pointing out its defects, however, we must not forget the many



ARCHITECTURE OF THE SEVENTEENTH CENTURY.—INTERIOR OF THE CHAPEL OF VERSAILLES.

THE GALLERY DES GLACES, IN THE CHATEAU OF VERSAILLES.

difficulties the artist had to contend against in its erection, and that he was in many instances obliged to deviate widely from his own plans in deference to the wishes of others. His last work was the Chapel of Versailles, which he did not live to finish. In it he was allowed to put his ideas into practice without control, and it consequently possesses more excellence than any other of his achievements. He forms another example of the truth of the aphorism, that great men always appear when they are needed. No man less able could have carried out the giant schemes of Louis XIV., and Louis was not slow to reward him. He was decorated with the order of St. Michael, was appointed Architect to the King, and General Superintendant of Buildings, Arts, and Manufactures. He was one of the patrons of the Royal Academy of Painting and Sculpture. It was in this character that he represented to the King the desire of the body to revive the ancient custom of exhibiting the works publicly. Louis approved of their intention, and granted the gallery of the Louvre for the exposition. Mansart also procured for the Academy an increase of its allowance from Government, and presented to it a great number of figures, modelled from the antique, for the use of the students. He died suddenly in 1708, and was buried in the church of St. Paul, where there is a monument to him by Croysevox.

THE PORTRAIT GALLERY.

THE QUEEN AND PRINCE ALBERT.

The language of eulogy, when applied to kings and queens, generally becomes a direct falsehood, or subsides into unmeaning commonplace. The graceless Charles II. was "our most religious King." The royal libertine, who spurned from his home and heart, and consigned to an early grave, the wife he had sworn to cherish and protect, was hailed as "the first gentleman of the age;" and thus it has ever been. In the eyes of the world the graces of royalty amply compensate for its vices. When royalty is spoken of, the language of flattery only is heard. The censor speaks with bated breath. And thus the difficulty is increased when, as in the case of the illustrious individuals before us, the voice of praise is but the voice of truth.

In our sketch—as is but right—we must give the first place to our Sovereign Lady, Queen Victoria. The incidents of her life may soon be told. Her father was his Royal Highness Edward Duke of Kent, fifth child of George III. Her mother was Victoria Maria Louisa of Saxe Coburg Saalfeld, who was born at Coburg on the 17th of August, 1786. In her sixteenth year this amiable princess became the consort of the hereditary Prince Leiningen; but after the birth of two children she became a widow, and was married to the Duke of Kent on the 29th of May, 1818, with all due splendour, at Coburg, in conformity with the Lutheran rites. The illustrious couple immediately set out for England, and on arriving at Kew Palace the marriage ritual was again performed according to the service of the Church of England. "This," says a writer in the "Annual Obituary" for 1821, "must be allowed to have proved a fortunate, for it was a happy, union. They exhibited towards each other the most marked attention and regard." The result of this union was the birth of Her Most Gracious Majesty Queen Alexandrina Victoria the First. In eight short months the mother was again a widow. The Duke of Kent expired on Sunday, January 23, 1821, one week previous to the demise of his royal father, George III.

The childhood of the Princess was passed under the guardianship of the Duchess of Kent, who, in every respect, appears to have been well qualified for the task. The Queen's governess was the companion and friend of the Duchess—the Baroness Lehzen; and one better adapted for fulfilling the duties of her situation could hardly have been selected. The Princess was early taught to consider herself as the possible future depository of a trust to be exercised only for the good of the whole community; and when, in the course of time, the succession to the throne became no longer a matter of speculation, the additional aid of the late Bishop of Salisbury, subsequently assisted by the Archbishop of Canterbury and the Bishop of Lincoln, was invoked. At the age of nine years the Princess had made considerable progress in the ordinary branches of polite education. She could understand the French, Italian, and German languages. But her *penchant* was evidently for the fine arts, more particularly music, for which, from her earliest childhood, she displayed considerable taste. We are told, on one occasion—the first, we believe, of the kind—when Beethoven's celebrated "Hallelujah to the Father" was performed before her Royal Highness, when that beautiful passage, "The exalted Son of God," burst upon her astonished ear, she manifested very great emotion. For several minutes after the conclusion of the chorus her Royal Highness seemed spell-bound, as though a new theory had suddenly been propounded to her imagination; and it was not till the expiration of some minutes, during which she seemed insensible to all around her, that she was able to give expression to her feelings of delight. A letter describing the confirmation of her Majesty, which took place July 30, 1835, may not be deemed uninteresting. "I witnessed," says the writer, "a beautiful touching scene the day before yesterday, at the Chapel Royal, St. James's—the confirmation of the Princess Victoria by the Archbishop of Canterbury. The royal family only was present. The ceremony was very affecting: the beautiful, pathetic, and parental exhortation of the Archbishop, on the duties she was called on to fulfil, the great responsibility that her high station imposed on her, the struggles she must prepare for between the allurements of the world and the dictates and claims of religion and justice, and the necessity of her looking up for counsel to her Maker in all the trying scenes that awaited her, most impressive. She was led up by the King, and knelt before the altar. Her mother stood by her side weeping audibly, as did indeed the Queen and the other ladies present. The old King frequently shed tears, nodding his head at each impressive part of the discourse. The little Princess herself was drowned in tears. The ceremony over, the King led her up to salute the Queen and royal duchesses present."

The following authentic fact exhibits a most gratifying feature in the character of her Majesty. A man named Killman, who served in the capacity of porter to the late Duke of Kent, had a daughter much afflicted and confined to her bed. On the evening of the late King's funeral, this young woman received from Queen Victoria a present of the Psalms of David, with a marker worked by herself, having a dove, the emblem of peace, in the centre, placed at the forty-first Psalm, with a request that she would read and derive from it the consolation it was intended to convey. The Queen is said to be passionately fond of children. The following anecdote went the round of the newspapers some few years since as an illustration. Her Majesty commanded Lady Barham, one of the ladies in waiting, to bring her family of lovely children to the Palace. They were greatly admired and fondly caressed by the Queen, when a beautiful little boy, about three years of age, artlessly said, "I do not see the Queen—I want to see the Queen," upon which her Majesty, smiling, said, "I am the Queen," and, taking her little guest into her arms, repeatedly kissed the astonished child. We give one more anecdote, as an instance of her Majesty's religious feeling. A noble lord, in this respect very unlike her Majesty, arrived at Windsor recently late on Saturday night. "I have brought down for your Majesty's inspection," he said, "some papers of importance, but as they must be gone into at length, I will not trouble your Majesty with them to-night, but request your attendance to them to-morrow morning." "To-morrow morning?" repeated the Queen; "to-morrow is Sunday, my lord!" "But business of state, please your Majesty"—"Must be attended to, I know," replied the Queen; "and as, of course, you could not have come down earlier to-night, I will, if these papers are of such vital importance, attend to them after we come from church to-morrow morning." On the morrow, much to the surprise of the noble lord, the sermon was on the duties of the Sabbath. "How did your lordship like the sermon?" inquired the young Queen. "Very much, your Majesty," replied the nobleman, with the best grace he could. "I will not conceal from you," said the Queen, "that last night I sent the clergyman the text from which he preached. I hope we shall all be the better for it." The day passed without a word on the subject of the papers of importance, and at night, when her Majesty was about to withdraw, "To-morrow morning, my lord," she said, "at any hour you please, as early as seven if you like, we will go into these papers." His lordship could not think of intruding at so early an hour on her Majesty; "nine would be quite time enough." "As they are of importance, my lord, I would have attended to them earlier, but at nine be it." And at nine her Majesty was seated ready to receive the nobleman, who had been taught a lesson on the duties of the Sabbath it is to be hoped he did not quickly forget.

But we must return to our narrative. On the decease of her uncle, King William IV., June 30, 1837, her Majesty succeeded to the throne. On the 21st of the same month she was proclaimed, and on the 28th the ceremony of her coronation was performed. But we now come to an event of more importance—her marriage with Prince Albert, which took place February 10, 1840. It is time that we say something of the Prince, who is the husband of our Queen, the father of our future Kings, and to whom we are indebted for the idea of the Great Industrial Exhibition.

His Serene Highness Prince Albert Francis Augustus Charles Emanuel, Duke of Saxe, Prince of Saxe Coburg and Gotha, was born on the 26th of August, 1819, and received the first rudiments of education in the Castle of Erenburg. His father was one of the numerous honorary princes with which Germany abounds. Before the French invasion there were 300 of these principalities. At the Congress of Vienna, however, their number was reduced to 38. Besides its separation into states, Germany was divided by Wenceslaus in 1307, and by Maximilian in 1500, into nine grand sections, called circles.* Of these two are comprised in Saxony Upper and Lower. In Lower Saxony we find Coburg Gotha, a territory not very large, but very much improved since the accession of Prince Albert's family. It is the most southern of the Saxon independent states, and is surrounded by Schwartzburg, Meiningen, Hildeburghausen, and Bavaria. The valley of the Itz forms the greater part of its territory. The Thuringian mountains stretch along the northern boundary of Coburg, which is only about one-fourth larger than Rutlandshire, having an area of not quite 200 square miles in extent. Joined, however, to Gotha, the territory of the Duke equals in size the county of Dorsetshire, having a surface of a thousand square miles. Much of this is covered by mountains and forest land. As to Prince Albert's family, we may here briefly state that the Duchess of Kent is his aunt, and Leopold, King of the Belgians, his uncle. We may further state that some of his ancestors were noticeable men. In the dimness that overhangs the days of Charlemagne we faintly perceive a Saxon chief named Wittekind, who for thirty years defied that Prince's power. From his loins sprung the race of which Prince Albert is a younger son. All readers of Luther's life know how he was befriended by the Elector of Saxony, Frederick "the Wise," John "the Constant," and John Frederick, "the Magnanimous." Prince Albert boasts these men as his ancestors. Their blood floats in his veins, still he is true to the faith they held.

We have already stated that Prince Albert received the rudiments of his education in the Castle of Erenburg. His masters were chiefly selected from the College of Coburg, and his proficiency was of the most signal character. After the death of Prince Albert's mother, Dorothy Louisa Paulina Charlotte Frederica Augusta, daughter of Augustus, the last Duke but one of Saxe Gotha Altenberg, while his father was engaged in arrangements for a second alliance, it was thought expedient that the Prince should be removed for a time from home, and he became the visitor of her Royal Highness the Duchess of Kent, and the fellow-student of the young Princess, whose heart and hand he was afterwards to share. Who knows but that were then sown the seeds of that attachment which rendered the after marriage of so different a character to what royal marriages generally are! Be this, however, as it may, Prince Albert, who had completed his eleventh year, partook of the lessons in the English language, music, and the various sciences, which were given to his illustrious cousin. Fifteen months were thus spent, when, after his father's second marriage, he returned home. So assiduous was the Prince in his application to study, that at the age of seventeen he passed with *éclat* an examination which admitted him into the University of Bonn, where his education was completed, and where, owing to his amiable manners and propriety of conduct, he became a general favourite.

When, at the close of his university career, Prince Albert returned to his father's court, the inhabitants of the duchy vied with each other in doing honour to the event. His entry into public life was celebrated by poems, balls, illuminations, and rejoicings of all kinds. Soon after the Prince paid a second visit to this country. The occasion was the coronation of her Majesty. Amongst the guests brought together by that event were no visitors more popular than the Prince and his illustrious sire. On his return the Prince prepared for a tour in Italy, where he spent the winter of that year. Already it is probable that the event which was to raise the Prince to so high a rank was in contemplation. It is said, on his return from Italy, the first object that met his eyes on entering his apartment was a portrait of her Majesty, which had, during his absence, been sent over for his acceptance from the Queen. At any rate, coming events will cast their shadows before. Hints were dropped by "our own special correspondent," and at the beginning of October, 1839, Prince Albert embarked with his brother, Prince Ernest, for his third visit to London. During this sojourn all doubts were put to flight, and on the 2nd of November following, her Majesty, at a court held at Buckingham Palace, declared that the Prince was the husband of her choice. The course of royal love did run smooth, and on the 10th of February, 1840, the service read alike over the highest and the lowest in the land, joined together the royal pair. Amidst the nation's joy the ceremony was performed; and long be it ere the tie be dissolved at the bidding of One mightier even than mailed baron or crowned king! The issue of that marriage are—1, Victoria Adelaide Mary Louisa, Princess Royal, born November 21, 1840; 2, Albert Edward, Prince of Wales, born November 9, 1841; 3, Alice Maud Mary, born April 25, 1843; 4, Alfred Ernest Albert, born August 6, 1844; 5, Helena Augusta Victoria, born May 25, 1846; 6, Louisa Carolina Alberta, born March 18, 1848; 7, Arthur Patrick William Albert, born May 1, 1850.

Prince Albert's fame preceded him on English ground. We had heard of him as a scholar, and a ripe and good one. A fellow-student of the Prince at Bonn, in a letter published in the *Times*, stated that the Prince was not only conversant with several European languages, but that he was deeply learned in the classics—that when at Bonn he had published an elegant volume of lyrics for the benefit of the poor—that his skill in painting was also considerable—and that in the composition of several songs he had shown himself a good musician. Proofs of these qualities have now become familiar enough. We were prepared for them, and not surprised at the manifestations of them; but we were not prepared for the untiring philanthropy, for the graceful domestic life, for the greatness of aim, evinced by the Prince. For the birth and realisation of that great idea which, more than any event in our own time, has aided progress, and has prepared the way for the brotherhood of man, the world must for ever hold in veneration the memory of the Prince. No prouder monument could man desire. When the Pyramids shall have crumbled away—when the monumental brass shall have decayed—when London shall be what Tyre and Sidon are now—still 1851 will be memorable in the annals of the world; and labour's sons will remember, as they toil at the loom, or the forge, or the plough, or the mine, who it was that vindicated for labour her proper place in the breasts of men—who it was that asked the world to do homage to peace and its attendant arts.

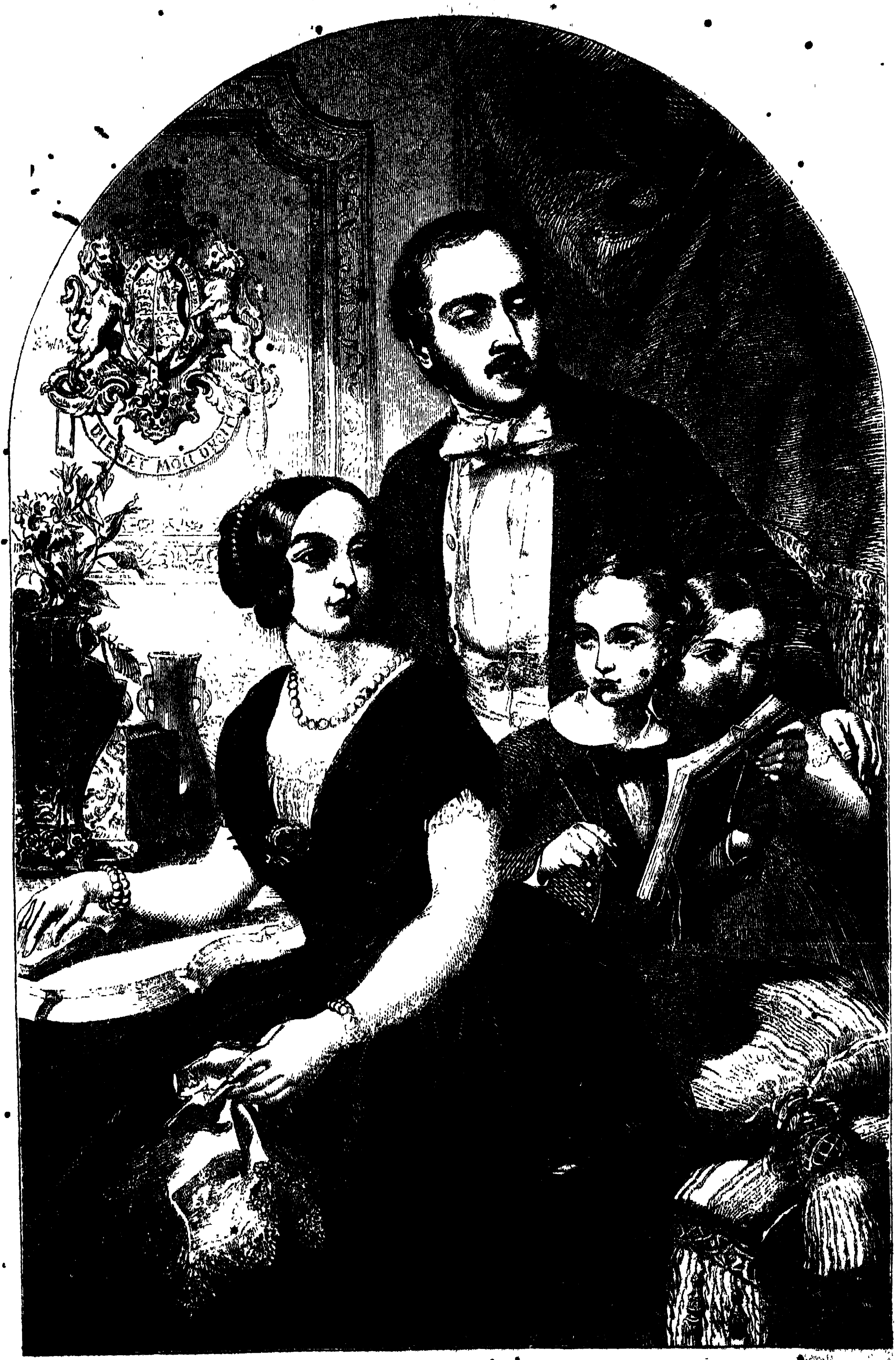
With all our great institutions—with all our national celebrations—with all our national sympathies—have the names of Victoria and Albert become entwined. When revolutions raged in neighbouring lands—when blood was spilt in Vienna, in Paris, in Berlin—when thrones tottered to their fall—in our land peace and order remained secure. The future historian will have to tell how, when Victoria went amongst her people—whether she visited the cotton-spinners of Manchester or the peasantry of Buckinghamshire, or in the presence of the denizens of every clime, in fitting manner, with the organ's peal and the voice of prayer, opened the Crystal Palace—all along the way glanced eager and admiring eyes, and everywhere were the teeming manifestations of a nation's loyalty and love. The common respect due to those in authority would never have secured this. We must seek for the popularity of the Queen and her Royal Consort elsewhere—in the manifestation of those virtues, and attainments, and powers, which win no mean place for the possessors of them in private life. Already an inscription commemorative of the virtues of our Queen has been written by our poet-laureate. We give it, as a graceful conclusion to this hasty sketch:—

"Her court was pure; her life serene;
God gave her peace; her land reposed;
A thousand claims to reverence closed
In her as mother, wife, and queen.

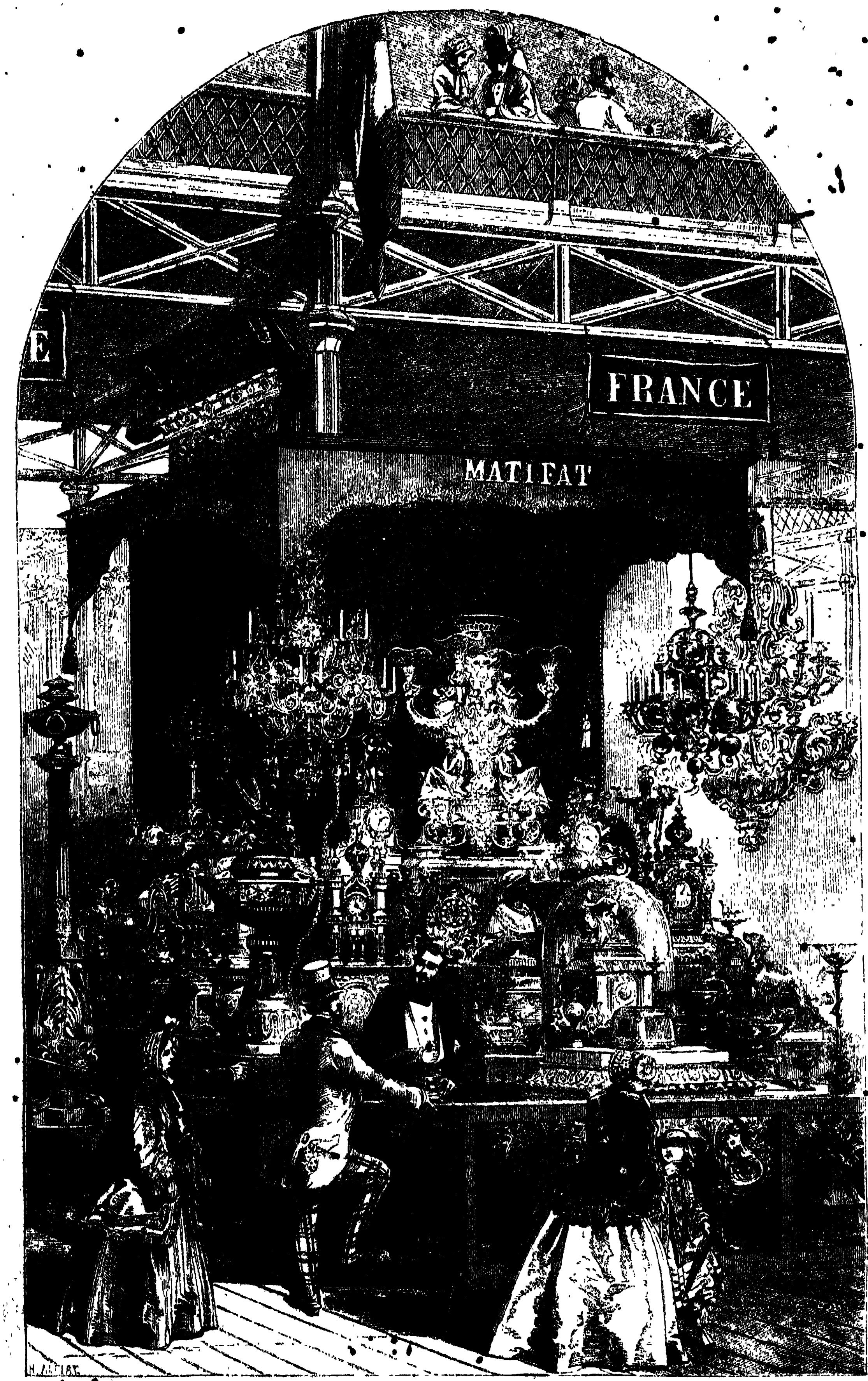
She brought a vast design to pass,
When Europe and the scattered ends
Of our fierce world were mixed as friends
And brethren in her halls of glass.

And statesmen at her council met,
Who knew the seasons when to take
Occasion by the hand, and make
The bounds of freedom broader yet,

By shaping some august decree
Which kept her throne unshaken still,
Broad-based upon her people's will,
And compassed by the inviolate sea."



HER MAJESTY QUEEN VICTORIA, PRINCE ALBERT, THE PRINCE OF WALES, AND THE PRINCESS ROYAL.



M. MATIFAT'S STALL IN THE GREAT INDUSTRIAL EXHIBITION.—CENTRE AVENUE.

REMINISCENCES OF THE GREAT EXHIBITION.

UNDER this head we shall refer, from time to time, to the almost innumerable objects of interest which graced the walls and stands of the glorious Crystal Palace. Without attempting anything like classification, we shall select for examination and illustration such remarkable contributions as the exigencies of time and space have hitherto permitted but feeble record. Indeed, such is the apparent inexhaustibility of that wondrous collection, that, on a retrospective glance, the mind despairs of comprehending it as a whole; but now that the crowds have separated, and the gates are closed; now that the excitement has somewhat cooled, and visitors from foreign parts and quiet country places have again reached their homes; now that the splendid trophies of human ingenuity and enterprise have returned to their respective owners, and that vast array of wealth and grandeur is dispersed—we begin to faintly realise the magnitude and purpose of the Great Industrial Bazaar.

The Exhibition of the Industry of all Nations having finally closed, we are enabled to look on its results as matters of history, and recal the various events of those eventful months with a somewhat calmer and more philosophic spirit. Two reflections arise out of the mass, which, above all the rest, will read the world a great lesson. The first, that thousands of people, gathered from every civilised corner of the earth, speaking different languages, brought up under different modes of government, exercising different forms of religion, and putting faith in different creeds, passed daily through the noble edifice, not only without accident or mischief, but positively without inconvenience to themselves. The people were their own police; and the six millions went, and wondered, and departed in good-will and peace. History records no fact like this. Not less surprising, or less suggestive, is the amazing thought that seventeen thousand exhibitors, who, like the visitors, were of almost every nation and kindred under heaven, entrusted the most valuable evidences of their wealth, their skill, their industry, and their enterprise to the guardianship of some fifty policemen, armed with no better weapon than a wooden baton, and earning wages but little superior to that of the day-labourer. Day after day and night after night passed on, and no added force was requisite for the safety of the almost countless wealth deposited within those fragile walls. One can scarcely comprehend the strength of so much confidence and reliance on the law and order of Great Britain. In no other country of the world could such an exhibition of the industrial arts have taken place. Do we say this boastingly, or of a vain spirit? No; rather let us humble ourselves before the Throne of Mercy, and be thankful that it has been vouchsafed to us in our generation to lead the peoples onward in the march of peaceful enterprises and industrial triumphs.

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On reviewing the list of prizeholders, we cannot but be struck with the number of medals awarded to our neighbours the French, for their excellence in all that pertains to the elegant in art, and by presenting to our readers a picture of

THE CONTRIBUTIONS OF M. CHARLES MATIFAT.

we believe that we are doing them good service. The bronzes of France have been long and deservedly celebrated, and a goodly show of them accordingly appeared in the Crystal Palace—clocks, chandeliers, vases, Greek, Etruscan, and mediæval cups, centre-pieces, fancy articles, figures, household appliances, and ornaments innumerable; and of the French exhibitors in bronze and silver MM. Matifat and Vittoz were confessed the most successful. Indeed, you might know where to find the stall of the former gentleman, by looking from the gallery for a well-dressed crowd!

An examination of the bronzes of France proves incontestably that art-knowledge and manufacture have taken a permanent hold on the national mind. Here are vases in which the graceful forms of Etruria and Greece are revived, and the eternal line of beauty rendered in a thousand pretty ways. Surely there is an education of the eye, which is not without its useful results in refining and civilising the mind. Here is a glimpse of the Palais Royal without the trouble of travel. Endless devices in silver, bronze, and metal-work, which gleam and glitter in the sunlight as gaily as is their wont in noble saloon or bright boudoir, arrest the eye. Candelabra and marble tables, ivory caskets and artificial gems, set prettily in filigree that looks as valuable as though it were real gold and silver, catch the wandering attention. Anon an army of clocks, in which the ever-varying fancy of the artist has full play. Figures of *le petit corporal* in all varieties of attitude—on horseback on the Alps, with cloak thrown back and raised right hand—sitting beside watchfires in lonely bivouacs, or brooding moodily out upon the wide, cheerless ocean from a barren rock; Huguenot and Puritan lean heavily on basket-hilted swords; Saracen and Crusader face each other bravely, with uplifted partizan and deadly lance; the cavalier rides madly on, urging the wildest of steeds; the Arab waves aloft his long, slender spear; and warriors of every nation and time appear as supports to these magnificent horologes.

Under the term bronzes are included many varieties of manufacture. Bronze, properly so called—the metal in which Cellini produced so many wonders of art-workmanship—is composed of an amalgam of copper and tin in various proportions; and the ancients are said to have occasionally added small quantities of silver and lead. Good bronze metal furnishes the artist with a fusible, hard, and durable material, capable of receiving a high degree of finish.

Bronzes in electrotype are but imitations and reproductions in metal of works in plaster, wax, clay, &c. By this process all the minute chasings and ornamentations in the original can be produced with marvellous fidelity and minuteness. They are very different in character, however, from those works of art which are chased and finished by the hand of the sculptor.

The other and more common acceptation of the phrase are those castings in inferior metals, which, by the aid of bronze powders, paints, &c., are made to assume the appearance of the higher-class work. Numerous specimens of this kind of imitation—an imitation which has only cheapness to recommend it—appeared in the Exhibition: various casts in zinc, both bronzed and in the natural colour of the metal, attesting the capabilities of that metal. Among the examples of bronzed zinc may be instanced the colossal, but not very successful, statue of the Queen, exhibited by the Vieille Montagne Company, and the wonderful Horse and Amazon, of Kiss, from the foundry of Geiss, of Berlin.

To notice in detail the majority of the objects which graced the stall of M. Matifat would occupy greater space than we can well afford; though we may instance, as evidences of extreme good taste combined with the requisite success in manufacture, the ivory cabinet with the mother dancing her infant on her knee—seen under a glass case in the centre of our engraving,—the mirror in the style of Louis Quartorze, the metal chandelier, and the pillar with ornamented base. All the works exhibited by this gentleman, indeed, bear witness to a highly educated taste, and a good knowledge of the capabilities of materials.

The manufacture of bronzes may be said to be yet in its infancy in Great Britain. It must be remembered, however, that the foreign workman enjoys the advantage of experience aided by a sound artistic education; and that the close connection of this branch of manufacture with the fine arts, has rendered the productions of France so far superior to those of our own country, that we might despair of winning the race in art-manufacture for many a long day to come. But we must not despair. The Exhibition has taught us many valuable lessons, not the least of which is the importance of a high-class education for the workmen. To attain excellence in any art, it is necessary that we should study to invent. The wholesale piracy of designs not only makes no artists, but it actually produces workmen indifferent to the claims and rewards of genius—throws impediments in the way of improvement—and, what is perhaps the most convincing argument with Englishmen, does incalculable injury to trade.

Let us, then, improve the time while the memory of the Great Exhibition is yet fresh in our minds, and profit by the opportunities we have had for a close examination of the products of other nations—opportunities which may never occur again.

NATURAL HISTORY.

WHAT IS AN EGG?

Of the thousands who eat eggs every morning at their breakfast, probably very few look upon them in any other light than as things to be eaten, and not worth a moment's examination, beyond what may be necessary to ascertain their soundness. And yet an egg is one of the most marvellous—nay, one of the most important—objects in the creation. It forms the origin of every individual in the animal world. "*Omne animal ex ovo,*" said Harvey; and the utterance of this aphorism forms, perhaps, almost as large a contribution towards this great man's celebrity, as his discovery of the circulation of the blood.

Every animal is born from an egg! The truth may be new to many—but it is not the less a truth on that account. There is perfect sameness in the origin of everything which lives and grows. Plants and animals both spring from a simple cell; the after differences, however great or numerous, are but the developments, more or less extended, of the same primitive organisation. It may seem humiliating to believe that man, with the thousand conflicting passions of his heart, his "large discourse, capability, and god-like reason," should owe his origin to an atom as insignificant as that from which the poor toad which leaves its slime on the garden-walk has sprung; but it is instructive, as furnishing us with a new proof that we cannot "by searching find out God." The law of unity without uniformity is the supreme law of the universe. We see it in the stars, in plants, in animals, in man himself. It is a pity that men cannot be brought to acknowledge its authority in matters of belief.

Doubtless, at first thought, many would allege without hesitation that eggs are the peculiar characteristic of birds; but when we consider that fishes, differing so widely in their organisation and mode of life, propagate their species by eggs also, we shall at once perceive the probability that this is the case with all other animals. Upon closer examination, we find this supposition resolving itself into a certainty, the only difference being that, in the case of fishes and birds, the eggs are produced in an imperfect state, and left to be hatched by the heat of the water or air, or are covered up in a warm nest, whilst in the other they are enclosed in the bosom of the parent until the young animal has come to maturity sufficient to enable it to live in the outer world. It is only in the *former* instance, however, that we can watch the process of development, and to it, therefore, we shall confine our attention. This process is perfectly analogous in both cases.

What, then, is an egg—a bird's egg? It is an animal, as yet small—very small, not the thousandth part of an inch in length, and possessing only those organs which are necessary for its present existence and the gradual development of its other parts, and enclosed in a shell, with as much food as is necessary for its nourishment during the period of its confinement. The animal is the little whitish circle which may be observed upon the membrane which surrounds the yolk, and the yolk itself is food designed for its support. The yolk, then, is precisely analogous to the milk of the *mammalia,* or animals which nourish their young by suckling them; and the shell supplies the want of hair or clothing, by protecting the embryo from injury, suffering nothing to enter save the necessary quantity of heat and air, both of which find their way in through extremely fine pores. It must be remembered that eggs bear no proportion whatever to the size of the animals to which they belong. All animals, from the humming-bird to the elephant, are almost the same size in the commencement of their existence. The difference of the eggs is due to the difference in the amount of nourishment required, and this amount is strictly regulated by nature in relation to the size to which it is necessary the young animal must attain before it will be able to live in the outer world. And this evidently varies according to its organisation and future mode of life. To make our meaning clearer, the crocodile is destined to attain to an enormous growth, and yet its egg is smaller than that of many birds, because its young is able to get into the water and live upon its own resources before it is any larger than one of our lizards. There is, therefore, only as much food placed in the shell as will support it until it attains to that size—so that the egg is not much larger than that of a hen. So also, in the case of some very large fishes, the eggs are extremely small, because the young ones are able at a very early age to seek their own subsistence in the sea or the rivers. But a dog-fish needs to have great strength, and consequently great size, when it is set at liberty, and the egg in which it is produced is larger in order to give it a longer period for its development.

But it must be observed, on the other hand, that amongst those animals, whose mode of life is pretty nearly the same, the size of the eggs does bear proportion to the size of the animals which produce them. The size of the ostrich and of the humming-bird, when in the womb of the mother, does not differ in the least; but the nearer they approach to the form of their respective growths, the greater does the difference become. The difference at the period when the eggs are laid is very great; because the quantity of nourishment required in the one case is much larger than in the other.

The great difference between *viviparous* and *oviparous* animals is, the presence or absence of the egg at the period of birth. In the former case the young are brought to comparative maturity in the womb of the mother, inclosed only in a slender membrane, and nourished from day to day by her life-blood. In oviparous animals, on the contrary, the nourishment is supplied all at once, and inclosed with the embryo in a hard protective covering. By fishes, insects, and the greater number of reptiles, the egg is henceforth left to its fate to be brought to maturity by the heat of the sun, in the water, in the earth, or exposed to the open air.

But the young of most birds require not nourishment only, but a constant high temperature to bring them to maturity. This is supplied by inclosure in a nest, and by the heat of the parent's body. When the food inclosed in the shell is all used, the little animal comes forth. It is then either able to seek its own subsistence, as in the case of chickens; or where a great development of muscular power is needed to enable it to pass through the air, the parent still continues to supply the necessary support.

We hope we have said enough to show our readers the immense interest attached to the study of those very common things called eggs. There is none more worthy the attention of naturalists; but, at the same time, there is none more difficult. The great delicacy of the phenomena which present themselves, and the great complexity of the conclusions we have to draw from them, and, above all, the veil which men have for so long a period seemed disposed to throw over the origin of the living animal, have surrounded the subject with innumerable obstacles. But we may rest assured that whatever is, is a fit subject for human research.

> "He that gifted us with so large discourse,
> Gave us not that capability and god-like reason
> To rust in us unused."

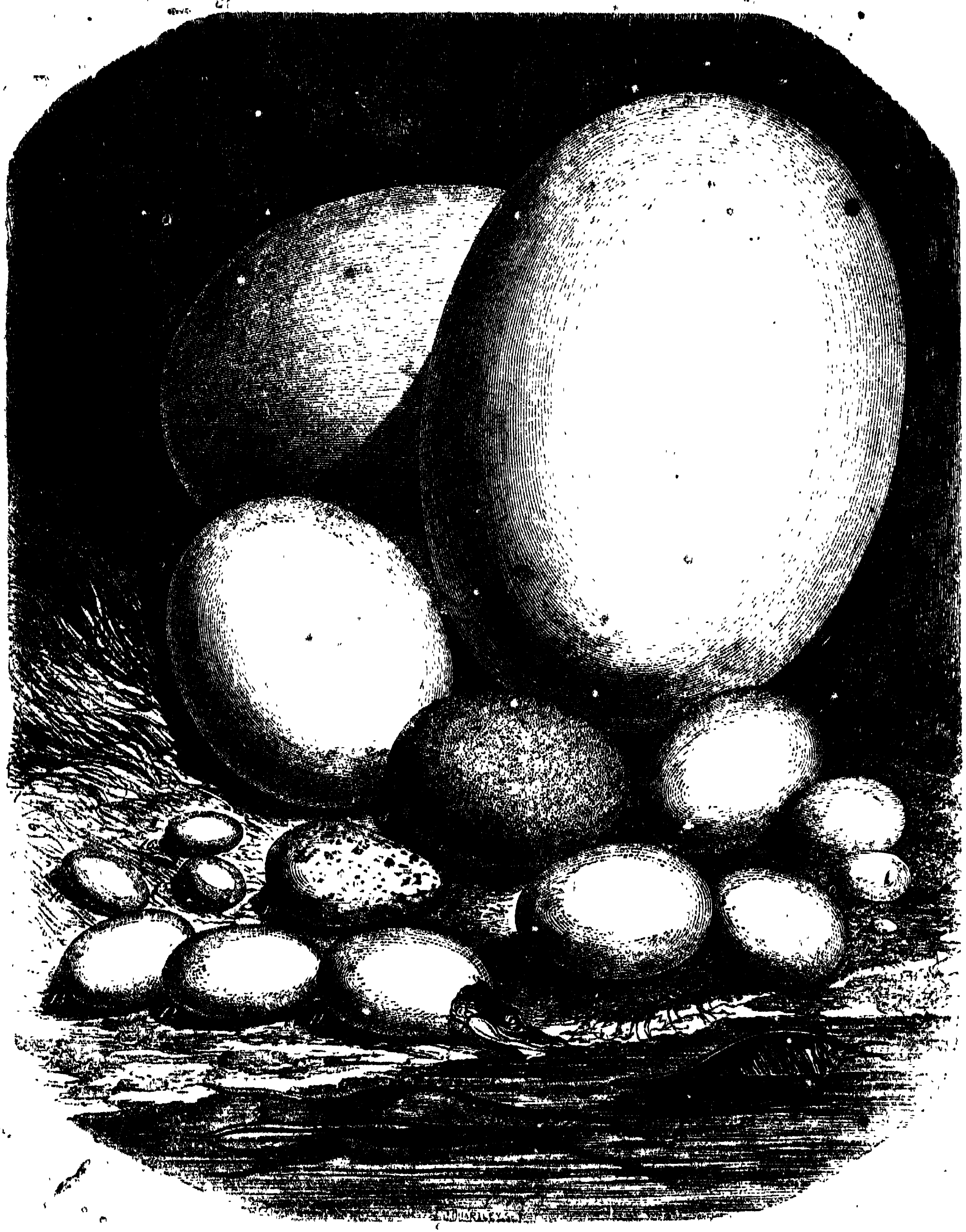
Nothing should be declared a mystery intended by Providence to be kept hidden from human eyes, until human intellect has, after repeated efforts, been baffled in the attempt to solve it. It is time enough to warn us away from the inner sanctuary of the temple of science, to cry with a voice of religious awe, "*Procul, O, procul este profani!*" when our worship has ceased to be humble and devout, and has become impertinent curiosity or impious prying.

We may at some future period return to this most interesting subject; and we shall here mention, for the information of our readers, that the *epyornis* referred to in our engraving was a large bird, of which the fossil remains have been discovered in Madagascar. The bird itself is no longer in existence.

To obtain a clear idea of the immense size of this bird, we have but to compare its egg with that of the ostrich. If the proportion of the bodies of the two birds be the same as that of their eggs, the epyornis would be to the ostrich as six to one.

None of the remains of the former have been discovered except the eggs and some bones, but there cannot exist the smallest doubt that both belong to the same animal. Some difficulty might be felt in pronouncing whether the eggs were those of an immense reptile, or a large bird. The structure of the shell is precisely analogous to that of the eggs of birds with short, or *rudimentary*, wings; but the question has been set at rest by the discovery of bones close at hand. Upon an examination of the latter, some eminent naturalists have arrived at the conclusion, that this great bird of Madagascar should become the type of a new genus in the classification of the *brevipennes*, or short-winged birds.

The epyornis was discovered buried in alluvial deposits, evidently of recent formation; and this circumstance warrants the belief that it belonged to the *fauna* of the present age; and not only so, but that it was still in existence at no very distant period.



COMPARATIVE VIEW OF THE SIZE OF THE EGGS OF DIFFERENT ANIMALS.

1. Epyornis.
2. Ostrich.
3. Cassowary.
4. Wild Goose.
5. Hen.
6. Pigeon.
7. Humming-bird.
8. Eagle.
9. Vulture.
10. Penguin.
11. Crocodile.
12. Python.
13. Freshwater Tortoise.
14. Boa of St. Lucia.
15. Tortoise.
16. Ophidian.
17. Dog-fish.
18. Ray-fish.

WORKS OF THE GREAT MASTERS.

THE INUNDATION.

None of the elements have contributed so much to the progress of civilisation as water and fire, and yet none have inflicted upon man calamities so terrible. The burning prairie and the roaring ocean are invincible by any exertion of unaided force which he can bring to bear against them. But in him intelligence more than supplies the want of material strength. The hunter fires the prairie to the leeward, and stands unscathed in the midst of a circle of flame, while the affrighted deer flies onward and is destroyed.

The battle, it is true, is not *always* to the strong alone, but it is *sometimes*—nay, often. Fire often burns down houses, often whole cities, despite our efforts to prevent it. The ocean overwhelms the mightiest navies, and breaks down the strongest embankments. In these awful catastrophes man seeks safety in his reason, the brute in its instinct; but the latter seems to recognise the superiority of the human intellect by flying to its master for aid in great peril. The association of the animal and the man creates between them a bond of affection—a sort of *solidarity*, so to speak, the result rather of sentiment than of calculation. What makes us regret the loss of the dumb companions with which they have lived is not their value only, but the love they bear us. When the Persian King drove the Athenians from their native city, their dogs crowded to the place of embarkation and attempted to get on board the gallies. When driven back, they returned to the city, and wandered up and down the deserted streets, howling piteously. And we are told that many a hardy soldier, whom the loss of his property and the approaching destruction of the favoured republic of the blue-eyed goddess could not move, was softened to tears by this sad farewell of the poor dogs. The sailors rested on their oars, and the whole army listened for a few minutes in mournful silence.

(Drawn by Freeman, after a Painting by Kiorboé.)

It has long been a matter of dispute at what point instinct may be said to end and reason begin. Whether it will ever be satisfactorily ended we cannot take upon ourselves to determine; but this much is certain, that acts and expressions of feeling have been recorded of animals, which, if they were not dictated by reason, at least prove beyond doubt that the brutes are in the habit, in many instances, of drawing deductions from analogy. We cannot tell how far the resources of the lower creation, in positions of peril and difficulty, may be diminished by want of experience. It is a pity that it is only within the last few years that men of science have begun to direct their attention to the subject. Perhaps no body is placed in a more favourable position for making researches in this department of natural history than artists, and to their labours we have of late been indebted for many striking illustrations of the habits of animals, valuable not less for their truthfulness than for their scientific accuracy.

In our engraving the artist has chosen a subject which exemplifies not only the horrors of inundation, but strikingly depicts the alternations of hope and despair, mortal fear and maternal affection, in a dumb brute! We comprehend at a glance the imploring agony of the position—the last resource of unaided instinct; we can almost fancy we hear the plaintive howl of distress, and feel, in spite of ourselves, some sympathy with the struggles of the mother and her young for safety. The planks of the kennel are already giving way. In the distance is a village, half submerged; a boat is putting off to the relief of the drifting family. It is one of the best efforts of the painter.

THE LADIES' DEPARTMENT.

At the commencement of the new year, and in the opening chapter of our Instructions in Needlework, a few words as to the scope and aim of our design will not, perhaps, be deemed inappropriate. From the earliest ages, the needle has been a resource to women in all stations of life. To the wealthy it has proved the solace of many an hour of suffering and sorrow; to the poor it has been, in addition, the means of earning a livelihood. This source of income has, moreover, advantages which few can boast. It does not involve the rending asunder of domestic ties (inevitable in many other branches of industry); it does not require an expensive education, or extraordinary talent. It is therefore peculiarly suited to the requirements of numbers of young women, and thousands have, of late years, gained their bread by their skill in decorative work. Until recently, embroidery, crochet, and knitting, in various styles, were the principal branches of ornamental needlework. Now another has been introduced, which bids fair to rival them all, and has, indeed, advantages which no other possesses. We allude to the art of making point lace—an art once practised by every gentlewoman, and brought to the highest perfection in the convents both of England and foreign countries; but which, for more than a century, fell so completely into neglect, that at length it came to be regarded as one of the marvels of other days—a sort of mysterious secret, lost in the lapse of years. But the great value attached to these relics of antiquity induced some adventurous individuals to turn their attention to them, in the hope of being able to produce similar wonders; and gradually, *very gradually*, specimens of lace, scarcely inferior to the choicest antique in design and execution, have been manufactured by these enterprising women. Were we to detail a tithe of the difficulties which they have had to surmount, we should scarcely be credited. Even the materials had, in many cases, to be manufactured expressly for the lace, for few of those in ordinary use were suitable for this delicate work; and then, though needles had greatly improved since the days of the Stuarts, unfortunately, *needlewomen* had not. We believe it is generally admitted that plain needlework is an art which has been greatly neglected during the last few years. It is, indeed, one of the rarest accomplishments. A celebrated author observes, that twenty young ladies can sing passably for one who can read well. It is equally true that *twenty* can do crochet or Berlin work for every *one* who can make a shirt.

For embroidery, and many articles in crochet and knitting, the materials are so expensive as to become a serious consideration, while the finished articles are of comparatively little value. Now, in point lace, the labour is the outlay; the materials have merely a fractional value. Hence it is peculiarly suited to those whose means are limited; and if the designs and instructions we shall be enabled to lay before our readers assist in adding to their means or pleasures, our labours will be well repaid.

Point lace, in all its varieties, with diagrams of the stitches, will therefore form one of the leading features of the Needlework Department of The Illustrated Exhibitor, and Magazine of Art for 1852; and novelties in embroidery, crochet, knitting, netting, and every other kind of fashionable feminine employment, will have its due place. Nor will the current fashions be neglected. To dress becomingly is the duty of every woman, in every station; and we trust our hints on the prevailing modes of attire, aided by the observations of some of our most eminent *artistes*, will be acceptable to our fair readers.

In conclusion, let us add, that we shall avail ourself of every means which the experience of years can suggest to make the Ladies' Department of The Illustrated Exhibitor the most perfect of its kind. In designs and receipts we purpose giving the very best and most appropriate materials that English or foreign manufacturers can supply. We shall notice improvements in articles and implements; and, in availing ourself of the increased knowledge obtained by daily study in the great school of art afforded by the Exhibition of the year now past, we hope to render this branch of our Magazine of Art acceptable to all classes of our countrywomen.

INSTRUCTIONS IN CROCHET.

It being our wish to give, as we proceed, as great a variety of subjects as possible in the Ladies' Department, we will begin by a brief abstract of the terms used in crochet, with such other instructions as may be necessary for understanding every receipt and design that can possibly appear. Should future difficulties puzzle the worker, it is to be hoped that a reference to these instructions will assist in overcoming them.

The Stitches used in crochet are, *chain*, *slip*, *single*, *double*, *treble*, and *long treble crochet*.

To Make a Chain, form a loop on the thread, insert the hook in it, and draw the thread in another loop through this. Continue this to form a succession of stitches.

Slip-stitch is made by drawing a thread *at once* through any given stitch and the loop which is on the needle.

Single Crochet (written s.c.).—Having a loop on the needle, insert the hook in a stitch, and draw the thread through in a loop. You then have two on the hook; draw the thread through both at once.

Double Crochet (d.c.).—Twist the thread round the hook before inserting it in the stitch, through which you draw the thread in a loop. Three loops being then on the needle, draw the thread through two, and then through the one just formed and the remaining one.

Treble Crochet (t.c.) and *Long Treble* (long t.c.) are worked in the same manner; in the former the thread is put *twice*, in the latter *three times*, round the hook, before inserting it into the stitch.

To Join Leaves.—When one part of a leaf, flower, &c., is to be joined to another, drop the loop from your hook, which insert in the place to be joined; draw the loop through and continue working.

To Pass from one Round to another without Breaking the Thread.—In working mats and many similar articles this is very desirable. Having finished one round, see whether a s.c., d.c., or t.c. stitch begin the next; for s.c. make one chain, for d.c. three, for t.c. four; slip the needle out, and twist the chain, then continue working. This twisted chain will have all the appearance of a d.c. or t.c. stitch. Should the round not begin exactly in the same place, slip-stitch to the part where it commences, as it will seldom be more than a few stitches in advance.

Square Crochet is a term often used, and generally understood, as the engraved patterns are mostly in it. Lest, however, any of our readers should not be familiar with the name, we will explain it. The squares are either open or close. An open square consists of one d.c., two ch.—missing two on the line beneath, before making the next stitch. A close square has three successive d.c. Thus, any given number of close squares, followed by an open, will have so many times three d.c., and *one over*; and any foundation made for a pattern to be worked in square crochet will have a number of chains divisible by three, leaving one over.

To Contract an Edge.—In forming leaves and many other things, this is very useful. It can be done in d.c., t.c., or long t.c. Having twisted the thread round the needle as often as the stitch may require, insert it in the work, and half-do a stitch. Instead of completing it, again twist the thread round, until the same number of loops are on, and work a stitch completely. Thus for two stitches taken in the work, there is only one head. This being successively repeated materially contracts an edge.

To Join on a Thread.—Avoid joins in open work as much as possible. In close work, whether d.c. or s.c., they will not be perceived. Finish the stitch by drawing the new thread through, allowing a couple of inches for both ends, which you hold in.

To Work with several Colours.—Hold the threads not in use along the edge of the work, and work them in. When the colour is to be changed, begin the stitch with the old colour, and complete it with the new, which continue to work with, holding the other in. If only one stitch of a colour is to be used, you finish one stitch, and begin the next with it; then change. Colours are seldom intermixed, except in solid work, such as the ends of purses, mats worked over cord, and the like.

To Work Over Cord.—Hold it in the left hand, with the work, and work round it, as you would if it were merely an end of thread. The stitches must, however, be sufficiently close to cover it entirely.

To Work with Beads.—Beads must be first threaded on the silk, or other material, and then dropped, according to the pattern, on what is usually thought the wrong side of the work. This side presents a more even appearance than the other. It follows that when bead purses are worked from an engraving, they are worked the reverse of the usual way—namely, from right to left.

The Marks used in Crochet Receipts.—These are very simple, when understood. They are printers' marks—asterisks, crosses, daggers, and sometimes one or two others. They are used to mark repetitions, and save space. The principal thing to observe is, that in every row or round, if *one* of any kind is used, a second, *similar* one, is sure to be found; and that the repetition occurs between the two, however far distant apart. Suppose a row of a pattern to be written thus:—× 2 d.c., * 4 ch., miss 4, * 1 d.c., 1 ch., miss 1, * three times, 5 d.c., × twice; it would, at full length, be—2 d.c., 4 ch., miss 4, 5 d.c., 1 ch., miss 1, 5 d.c., 1 ch., miss 1, 5 d.c., 1 ch., miss 1, 5 d.c., 2 d.c., 4 ch., miss 1, 5 d c., 1 ch., miss 1, 5 d.c., 1 ch., miss 1, 5 d.c., 1 ch., miss 1, 5 d.c. It will be seen that one [illegible] often occurs *within another*, as in the stitches between the asterisks. Another mode of shortening receipts can be used only where a row has a centre both sides of which correspond; the latter being the same as the former, worked *backwards*. Then the letters *b*, *a*, are used, to mark that in the latter part of the row you reverse the instructions. *b*, 7 d.c., 3 ch., miss 2, 1 d.c., 2 ch., miss 1, *a*, 1 d.c. (the centre stitch), would be, 7 d.c, 3 ch., miss 2, 1 d.c., 2 ch., miss 1, 1 d c., miss 1, 2 ch., 1 d.c., miss 2, 3 ch., 7 d.c. These letters and the printers' marks are equally used in knitting. It is easy to see how much space is gained by the use of these abbreviations, a knowledge of which is easily acquired. Probably many of our friends are already familiar with the substance of this preliminary lesson; but as daily experience convinces us that many are still ignorant of the principles of crochet, we trust the good-nature of the adepts will lead them to excuse this occupation of a page, in consideration of the benefit it will be to their less fortunate friends.

One word on the implement termed a crochet-hook. It should not be sharp or pointed, either in the point or barb, but smooth, and quite free from any angularity that can catch the silk. Cheap and common crochet-hooks are in the end the dearest, as they break cotton, ravel silk, wear out the patience, and prick the finger. They should be of the best steel, highly polished, and firmly fixed in ivory handles. Those we use have been made at our recommendation, and have the *size* engraved on every handle. This saves the tiresome and uncertain reference to a guage. These hooks are termed "*tapered, indented*" crochet-hooks.

EDITOR OF LADIES' DEPARTMENT.

LOUNGING CAP (IN CROCHET).

MATERIALS.—6 skeins of bright scarlet Berlin wool; 5 shades of green ditto, 6 skeins each; 12 skeins of black, and 4 of grey; 4 skeins of white, and 4 of grey floss or filoselle silk. A handsome shaded tassel, and a ball of rather fine twine.

The whole of this cap is worked in s.c, over the twine. Begin with the band round the head, by working 240 stitches with black wool, on the twine, and closing into a round.

2nd Round (black and grey wool): × 2 black and 2 grey alternately. × all round.

3rd (B. wool, white silk): × 1 b., 3 w., × all round.

4th: Black all round.

5th. Scarlet all round.

6th (Scarlet and darkest green): × 2 s., 4 g., 42 s., × 5 times.

7th (Scarlet, same green, and white): × 2 s., 5 g., 6 s., 3 w., 9 s., 3 g., 16 s., 2 w., 2 s., × 5 times.

8th (Scarlet, 2nd darkest green, black, and white): × 2 s., 2 g., 1 b., 3 g., 4 s., 5 w., 4 s., 2 g., 1 s., 3 g., 5 s., 4 g., 1 s., 3 w., 1 s., 3 w., 1 s., × 5 times.

9th (Same colours): × 2 s., 3 g., 1 b., 2 g., 4 s., 1 w., 4 s., 4 w., 2 s., 2 g., 6 s., 6 g., 2 s., 5 w., 1 s., 2 w., 1 s., × 5 times.

10th (Scarlet, black, white, and grey silk, 3rd shade of green): × 3 s., 3 g., 1 b., 1 g., 2 s., 2 w., 1 s., 4 grey, 1 s., 4 w., 2 s., 1 g., 5 s., 3 g., 1 b., 3 g., 1 s., 4 w., 2 s., 1 grey, 1 s., 2 w., × 5 times.

11th (Same colours): × 1 w., 3 s., 4 g., 1 s., 2 w., 1 s., 1 grey, 1 s., 4 grey, 1 s., 3 w., 3 s., 3 g., 2 s., 2 g., 1 b., 4 g., 1 s., 3 w., 2 s., 3 grey, 1 s., 1 w., × 5 times.

12th (Same colours, except green, which change to the next lightest shade): × 2 w., 3 s., 6 g., 1 s., 1 grey, 2 s., 3 grey, 1 s., 2 w., 3 s., 5 g., 1 s., 1 g., 1 b., 4 g., 2 s., 3 w., 1 s., 2 grey, 1 s., 1 grey, 1 s., 1 w., × 5 times.

13th (Same colours, with lightest green): × 2 w. (over the two first of last round), 7 s., 3 g., 2 w., 3 s., 1 grey, 1 s., 1 w., 3 s., 4 g., 2 b., 1 g., 1 b., 4 g., 3 s., 5 w., 1 s., 2 grey, 1 s., 3 w., × 5 times.

14th (Same, with lightest green but one): × 1 w., 3 s., 5 g., 2 s., 2 w., 1 s., 3 grey, 1 s., 3 w., 2 s., 2 g., 2 b., 4 g., 5 s., 2 g., 1 s., 1 w., 1 s., 2 grey, 1 s., 2 grey, 1 s., 1 w., × 5 times.

15th (Same, with next darkest green): 3 s., 4 g., 1 b., 1 g., 2 s., 1 w., 1 s., 1 w., 1 s., 2 w., 1 s., 3 w., 2 s., 7 g., 1 s., 5 g., 2 s., 3 w., 1 s., 3 grey, 1 s., 1 w., 1 s., × 5 times.

16th (Scarlet, black, white, and next darkest green): × 6 g., 1 b., 2 g., 2 s., 3 w., 2 s., 5 w., 3 s., 5 g., 1 s., 3 g., 1 b., 2 g., 2 s., 4 w., 3 s., 1 w., 1 s., 1 g., × 5 times.

17th (Same colours): × 1 s., 1 g., 1 s., 2 g., 1 b., 3 g., 3 s., 9 w., 2 s., 1 g., 6 s., 2 g., 1 b., 3 g., 5 s., 5 w., 2 s., × 5 times.

18th (Scarlet, white, darkest green): × 1 g., 2 s., 5 g., 5 s., 4 w., 1 s., 2 w., 2 s., 2 g., 6 s., 5 g., 7 s., 3 w., 3 s., × 5 times.

19th (Scarlet and darkest green): × 4 s., 3 g. (over centre 3 of 5 g.), 15 s., 1 g., 8 s., 3 g., 14 s., × 5 times.

Four rounds of scarlet complete the band round the head.

THE TOP OF THE CAP.—This is worked from the centre, and gradually increased until of the same dimensions as the band, that is, containing 240 stitches.

1st: Begin by working 12 stitches with black wool on the twine, and forming into a round.

2nd: Increase to 24 stitches.

3rd: Increase to 40.

4th (Black and grey): × 2 g., 2 b., × 13 times.

5th (Black and white): × 3 w. over 2 grey, 2 b. over b., × 13 times.

6th (Black and scarlet): × 4 s. over 3 w., 2 b. over b., × 13 times.

7th to 11th Rounds: All scarlet, increasing sufficiently to keep the work perfectly flat, and having 120 stitches in the last round, or 8 times 15.

12th (White, scarlet, and lightest green): × 5 g. on 4 s., 2 s. on 2, 1 g. on 1 s., 3 s. on 3, 3 w. on 3 s., 4 s. on 3, × 8 times.

13th (White, scarlet, 2nd lightest green): × 3 s., 1 g., 4 s., 2 w., 2 s., 1 w., 2 s., 1 g., × 8 times. [Observe that care must be taken to increase, so that the pattern begins always at the same point.]

14th (White, scarlet, and 3rd green): × 2 g., 2 s., 2 g. (over 2nd and 3rd of 4 g. in last round), 5 s., 3 w., 2 s., 1 w., 1 s., 2 g., × 8 times.

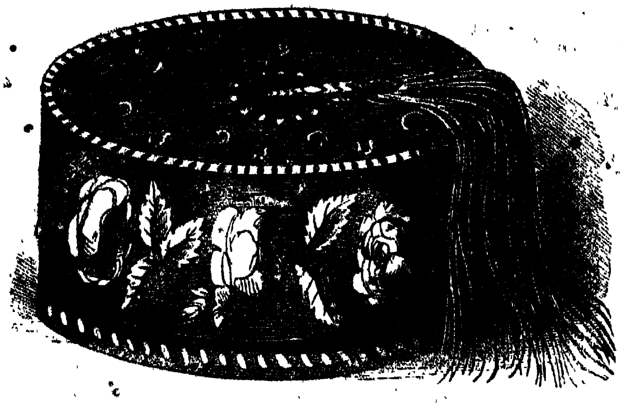
15th (Same green, white, and scarlet): × 2 s. over 2 g., 2 more s., 1 g., 1 s., 1 g., 3 s. over 2, 1 g., 2 s., 2 w., 2 s., 1 w., 2 s., 2 g., × 8 times.

16th (Darkest green but one, white, and scarlet): × 1 s., 2 w., 1 s., 1 w., 1 s., 2 g., 1 s., 2 g., 5 s., 2 w., 1 s., 2 g., 1 s., × 8 times.

17th (Same colours): × 1 s., 4 w., 3 s., 3 g., 5 s., 2 w., 1 s., 2 g., 3 s., × 8 times.

18th (Darkest green, white, and scarlet): × 2 s., 2 w. (over 2nd and 3rd of 4 white in last round), 5 s., 12 g. (the last over the 1st of 2 green), 5 scarlet, × 8 times.

There will now be 208 stitches. Work two rounds of scarlet (increasing to 240), and then join on the band. This is done by holding the top of the band and edge of the round together, and working one round, taking up the chain of both. Work on the twine with black wool and white silk, 2 stitches of each alternately. Draw in the end of twine. Take care, in placing the two parts of the cap together, to make that part which begins every round at the same place in both, as a small defect in the pattern is inevitable, and must be covered by the tassel. Draw the string of the tassel through the centre of the crown, and fasten it in its place. The cap may be lined with scarlet sarsnet.



LOUNGING CAP, IN CROCHET.—(*See page* 15.)

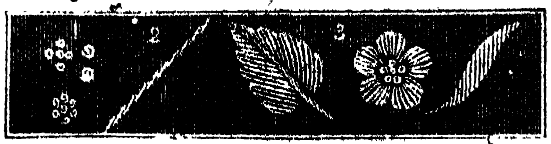
EMBROIDERED NOTE-BOOK, OR CIGAR-CASE.

Materials.—A piece of the finest kid leather, eight inches by twelve. The colour should be a dark stone; with fine *ombre* embroidery silks, blue and yellow green; four or five shades of pink, a needleful of each of which will suffice, and the same quantity of yellow.

Embroidery on leather is done in the same manner as every other kind of coloured embroidery; but as the leather is apt to give way when the stitches are very close to each other, it should be lined with fine linen before being stretched in the frame. As the term *ombré* may be new to some of our readers, we may remark that it is the *proper* name for those silks which are shaded in various tints of the same colour. Chiné silks are those shaded in various tints of *different* colours. The same observation applies to shaded wools.

The design is to be marked on the leather, in the same manner as in other embroidery. It consists of a spray of the Mophilla, and forget-me-nots in the centre, with a delicate sprig of rosebuds and leaves in each corner, so arranged that they nearly form a wreath. As the engraving is given the full size, the pattern may be traced from it. The leaves are worked in the usual long embroidery stitch, from the centre vein of each leaf to the edge, where the outline must be very clear and exact. The leaves being so small, the centre vein only is indicated in the work; it is done in half polka stitch; the stems are worked in the same. In the very small leaves, and the petals of rosebuds, no veining is made.

It requires a little taste properly to use the *ombre* silks. It will not do, for instance, to begin a leaf just at the end of the light part of a needleful of silk, as that would make the point and upper part of the leaf the darkest – a shading never seen in nature. Neither should the lower side of a leaf be the lightest. This must be avoided by beginning the lower side with the darkest part of the needleful of silk; and as this needleful may extend from the darkest to the medium tint, or from the medium to the very lightest (with any gradation between), it will be easy to work half a dozen leaves, all differing in some degree from the others, some being extremely dark, and others very light. The veinings should contrast slightly with the leaves; a very dark leaf may have a lighter vein, and *vice-versâ*.



EMBROIDERY STITCHES FOR NOTE BOOK.

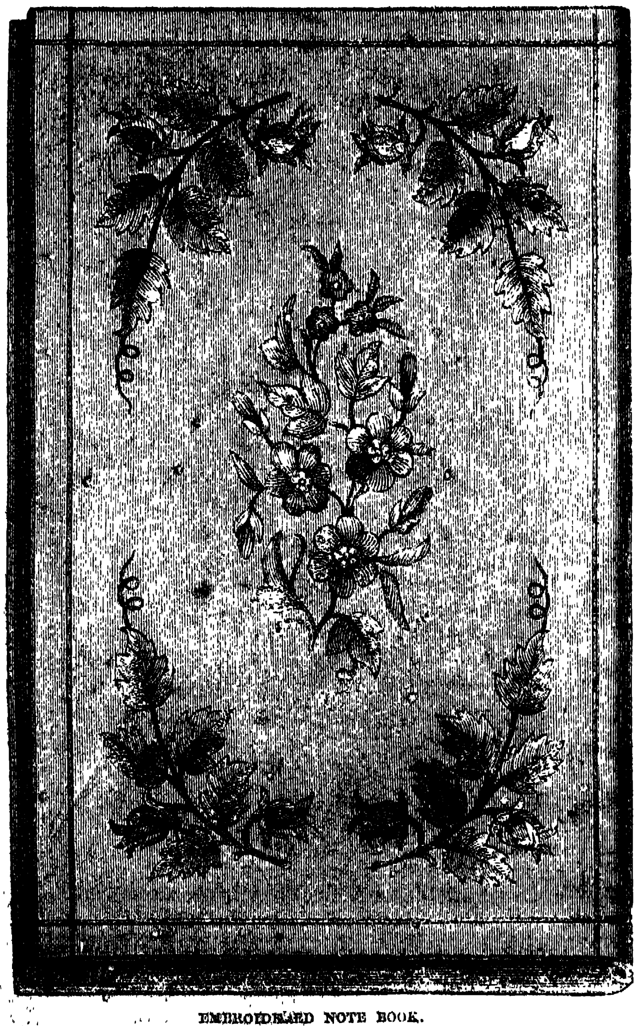
The observations we have made about shading the leaves may be applied also to the flowers: the lowest petals should be the darkest; the buds of the centre flowers must be of the darkest hue; the forget-me-nots at the top of the spray should be light; each rosebud should be of one shade, and all should differ as much as possible.

The lines in the engraving indicate the direction of the stitches in various parts, and the tint shows the degree of light which will have the best effect. The eyes of the flowers are worked in French knots with the yellow silk. There are six of those knots in the centres of the flowers, and one in each of the forget-me-nots.

STITCHES USED.

The French Knot.—This stitch is formed by drawing the needle through at the exact place where the spot is to be made; then, while holding the silk with the left hand, about two inches from the work, twisting the point of the needle twice round it, close to the embroidery. Again insert the needle in the same place you drew it out; and when the thread is pulled through tightly, the knot will be found complete.

Half-Polka Stitch.—A succession of stitches, of which the second is taken half-way down the side of the first, and half-way beyond it. The next being worked in the same way, two threads are always side by side.



EMBROIDERED NOTE BOOK.

Embroidery Stitch.—In this the stitches are parallel, and either short or long, as the pattern may require. Sometimes they are *radiated*, diverging from the same point, or inner side of a circle but they never cross over each other; the object being to present as smooth a surface as possible. (*See diagrams.*)

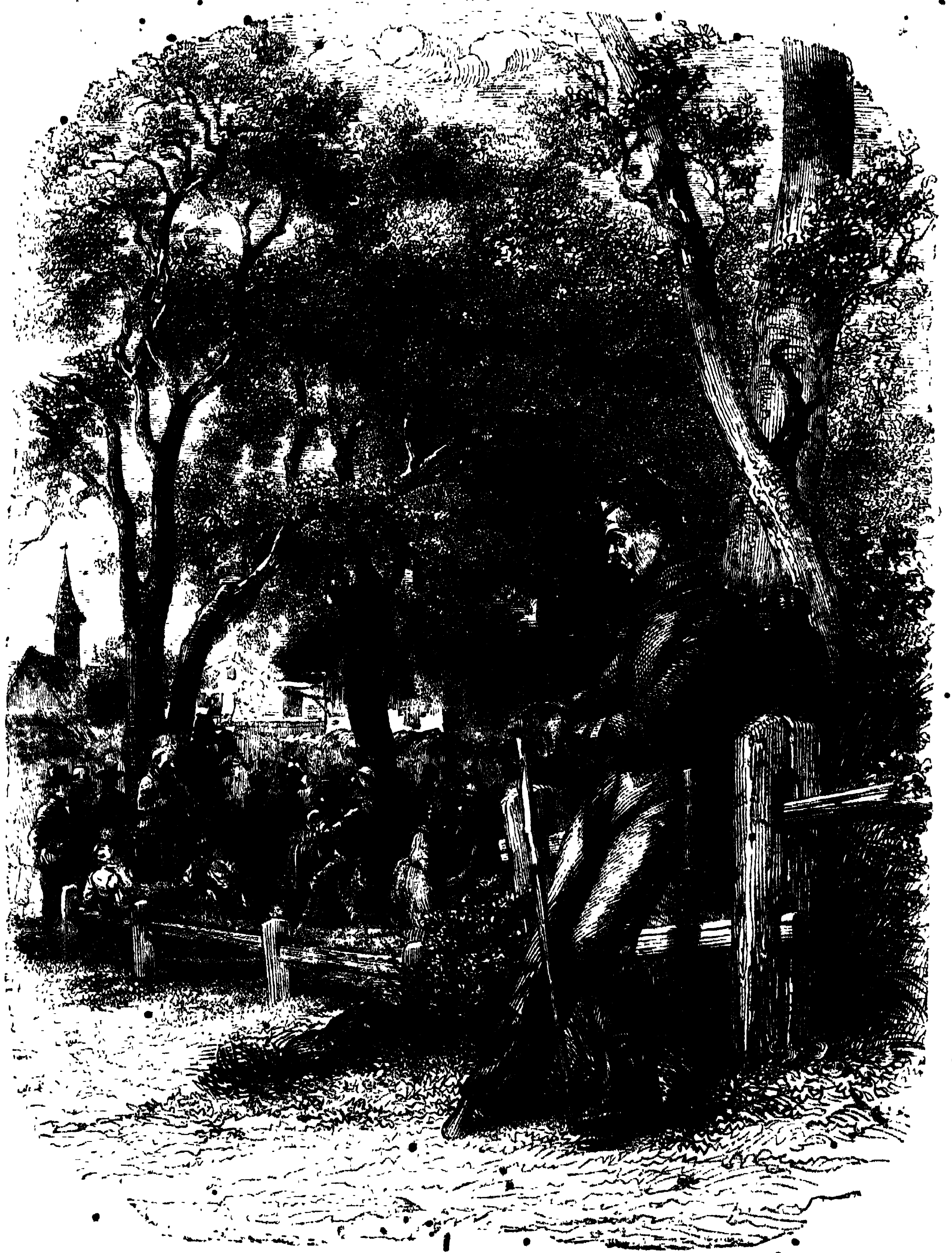
In future articles on coloured embroidery we shall refer the reader to these instructions.

Both sides of the note-book are to be worked. It should be mounted by an ornamental bookbinder. The pockets are made of leather, like the cover, lined with rich watered silk.

LOCAL AND DOMESTIC SCENES.

THE WOODEN LEG.

Art has achieved some of its most popular works by founding them upon homely, simple, and pathetic subjects. In poetry, the "Soldier's Dream," the "Soldier's Return, and the "Soldier's Death," have been immortalised. Those subjects have been made equally famous by the sister art of painting. "The Wooden Leg" has become the theme of several well-known productions; and not only in England, but on the Continent, painting, music, verse, and historical narrative, have united in its celebration. We present our readers with a well-finished engraving, from a beautiful drawing by Karl Girardet, for the incident of "The Wooden Leg" is, unfortunately, but too common, and "comes home to the businesses and bosoms" of people of every country.—A young soldier, returning alone from the theatre of war to his native village, and to the rustic scenes of his childhood, marches



painfully and slowly along the road indicated to him in his description of route. Fastened to the little havresac at his back, is the round tin case containing that document, and probably another—the certificate of his discharge. He is "invalided" by his country, for he has been disabled for the remainder of his days while engaged in its service. He marches on resolutely, but not, as of old, with activity or without pain, for you see him now with a wooden leg, which strikes with monotonous sound against the pebbly road.

"The *people*," said M. Kossuth, "are always just, always good," and for that reason the song or the painting that is based upon some honest feeling, that expresses some imperishable principle, never appeals in vain to the sound, unvitiated sensibilities of the mass.

The soldier before us is young, but his features do not express youth; there is a certain austerity and sadness on them. The cheeks are hollow; the forehead, dark with the fierce suns and inclement seasons he has endured, is marked with premature wrinkles, his eyes, surrounded by a sunken discoloured ring, have that look of mournful patience which is left on the face of one who has had to endure much, and has endured it well.

He arrives at a village, the church of which had been for some time visible above the trees. All at once, at a turn of the road, the sound of the clarionet is borne along the breeze to his ears; and a little farther on, through an opening in the green shades, he beholds the villagers dancing in one of those rustic balls of which gaiety and cheerfulness are the life.

Mounted on two empty casks, with a plank across them for a platform, the minstrels were pouring forth their vehement music; while the couples whirled around through the aerial lace-work of light and shadow formed by the rays of the sun and the foliage through which they penetrated.

The soldier halts abruptly, and, his back leaning against a paling, his left hand resting on the top of his walking-stick, and his right half open, hanging listless, he contemplates the scene with mute emotion. A thousand memories doubtless came thronging to his heart. He beheld, in the mind's eye, his own village; and he thought of the time when he had led the dance upon the green. No one better knew how to keep the time and measure of the music; none had a lighter foot, or a merrier eye, or a readier and wittier tongue. No one's heart was in those days more joyous than his. The young girls all liked him the best for a partner. Since then, only very few years had passed, and what a change! The merry dancer of other times was returning home, bent by fatigue, mutilated by war, not to be recognised by the eyes of his former companions, and hardly, perhaps, by any eyes except those of a mother. A horseman, who was passing by this poor disabled soldier—once a horseman, too—paused at this scene, which he understood at a glance. He waited till the soldier should resume his march. But the dancing continued, and the soldier continued to gaze. The stranger went forwards, passing close to the poor fellow, and the sound of the horse's hoofs did not rouse him, or make him look up; and, casting a furtive glance, the stranger saw two tears flowing silently down the hollow cheeks of the wayfarer.

In every point of view, public and private—in what regards the community as well as what regards the individual—*war* is an evil and a curse. Nor is the *recruiting* system less so, whether as carried out in France or in England. In France there is the Conscription, by means of which every one is obliged to serve, on whom the lot falls, according to the impartial award of chance. From the prince to the peasant, every one, whose health or whose organisation does not present impediments, is obliged to run the risk of this lottery; and whoever draws the fatal billet or number from the urn, is then forced either to take the uniform for five or seven years, or to find a fit and proper substitute. This, when effected, is generally by means of money. A needy young man is found who, for a price varying from twelve pounds upwards, is ready to sell his personal freedom, and to adopt killing according to rules as his profession, for the term of years specified; and on receiving his money, he relieves the payer of the unfortunate billet, and takes it himself. This system of recruiting is one to which all are equally liable, and a system in which no one enters the service without knowing what he is doing, and what he has to expect. The operation acts, so far, with a sort of general impartiality in its injury; it takes place in the face of day, and according to long-established and intelligible rules.

In England, no man is forced to become a soldier by law. But the army must be kept up to its desired footing, by some means or other; and hence springs one of the greatest disgraces which the social arrangements of a civilised country ever embodied within them. The recruiting-sergeant, when short of volunteers, resorts to the persuasions, or rather illusions, of pots of beer and measures of spirits. It is a serious matter to choose one's calling for life; it is a matter which ought to be decided with the eyes open, with judgment, caution, and careful consideration. It is generally decided in a state of incapable drunkenness, as far as regard our soldiers. They are taken to the pot-house, "a thief is put into their mouths to steal their brains," a shilling is slipped into their hands, on which, at the time, they are as likely to walk as on their feet; and lo! they are soldiers, if not for life, yet for a long series of years.

As the case actually stands, it is notorious that, in nine cases out of ten, before the recruiting-sergeant makes a *soldier* of the Englishman, he first makes a *beast* of him. But take it at its best, and remove all its incidental abuses, how sad a profession is that of the fighting-man—or, rather, how deplorable are those absurd passions which have given a sort of *quasi* necessity to the existence of such a profession! The popular little song has sense and sentiment in it as well as humour:—

"If I were Queen of England,
Or, still better, Pope of Rome,
I'd have no fighting men abroad,
Nor weeping maids at home."

WORKSHOPS, MANUFACTORIES, AND LABORATORIES.

A VISIT TO THE GUTTA PERCHA WORKS.

We live in eventful times; and every day brings to light some new discovery in science and the arts, or some special application of hitherto known but unappreciated agents;—here, a flash of the electric spark conveys intelligence from point to point, over mountains, and through the very sea itself; there, the discovery of [illegible] a law in nature robs romance of half its charms, and explains, in part, the dreamy superstitions of our ancestors; everywhere the mind of man is active and awake, and ready to receive new impressions. Indeed, one of the most remarkable characteristics of the age in which we live is—not the obstinate adherence to old customs which so eminently distinguished our immediate predecessors—not a firm disbelief in the powers of novel agencies—but an inquiring spirit, which, in some cases, amounts almost to blameable credulity.

Within the memory of living men, steam and gaslight, electricity and galvanism, photography and mesmerism, were unknown agencies to the great mass of the people; and it is only within the last ten years that the substance called "Gutta Percha" has become an useful appliance in domestic life.

We purpose, aided by the pencil of the artist, to record briefly the history and uses of this curious vegetable gum. Let us glance at the

GUTTA PERCHA IN ITS NATIVE WOODS.

Like photography and the new planet, this product seems to have had more than one discoverer—Dr. Montgomerie, assistant-surgeon to the Presidency at Singapore, and Mr. Thomas Lobb, botanical agent to the Messrs. Veitch, the well-known florists of Exeter, each claiming the discovery as his own, though each was miles distant from, and acting independently of, the other. Priority of discovery, however, seems by common assent to be given to the first-named gentleman. The home of the gutta percha tree is in the islands of the Indian Archipelago, where there is reason to believe that it is indigenous. In the year 1824 Dr. Montgomerie was out in the woods at Singapore, w[redacted]hands of a [redacted] woodsman, [redacted] the handle of which was composed of a strange substance. "I questioned the workman, in whose possession I found it," says the Doctor, in his account to the Society of Arts, "and heard that the material of which it was formed could be moulded into any form by dipping it into hot water, when it became as plastic as clay, and when cold regaining its original hardness and rigidity." Subsequent inquiry led to the fact that gutta percha, like caoutchouc, or india-rubber, is the sap of a species of sapotaceous forest tree, thousands of which abound in the dense forests of the Malay peninsula. Our engraving will convey a good idea of its noble proportions.

Of course, the Doctor was not long in disseminating his knowledge of so remarkable a substance. He speedily procured specimens of the tree and its product in various states of preparation, and forwarded them to the Society of Arts in London. As soon as it arrived in this country, its peculiar properties were rigidly inquired into; and, its value in manufactures being speedily ascertained, the gold medal of the Society was awarded to the Doctor as the first discoverer.

This substance derives its name, not from the scientific world —though it is curious that the first half of the term is the Latin word for *drop*, whence it might be concluded that gutta percha meant the *droppings* of the percha tree—but from the native Malays. It is pronounced *pertsha*, not *perka*.

Dr. Montgomerie had several opportunities of becoming acquainted with the method by which the gutta or sap was obtained from the tree. The fruit yields a "concrete and edible oil, which is used by the natives with their food," while the sap circulates between the bark and wood of the tree in vessels whose course is sufficiently well marked by black longitudinal marks. At first the natives were in the habit, when they required a supply, of felling the tree; but experience soon taught them that the milky juice might be collected by cutting notches here and there in the trunk, and that in this way the life of the tree might be saved for future "tappings." The sap coagulates in a few minutes after it is collected, but before the crude gum becomes quite hard, it is kneaded by hand into compact oblong masses from seven to twelve inches in length, by four or five in thickness. This part of the work is mostly performed by women, as seen in the engraving. The blocks made up for exportation, however, are not always of uniform size and appearance, the fancy of the rude barbarian sometimes giving them strange forms—such as that of a bird with red berries for eyes, images of ships, quadrupeds, or the "human face divine." The gum is always sold by weight—a fact which is taken advantage of by the crafty savage, who, in humble imitation of more clever adulterators, sometimes introduces a stone or heavy substance into the interior of the mass. As it would entail a serious loss of time on the merchant if he were to cut each block at the port of shipment, it often happens that, on the substance reaching this country, it is found to conceal stones or rubbish; and then, woe to the purse and the cutting-knives of the purchasers! Besides this, however, the blocks often contain a vast amount of unavailable material in the shape of bark, dirt, leaves, and so on, which become accidentally incorporated with the gum.

From the examination of the specimen sent over by Dr. Montgomerie, it became apparent that a large trade in the article would speedily take place; and in a few months the jungles of the Johore Archipelago, the scene of the first gatherings, were explored by Englishmen, Chinese, and Malays, in search of the gum-exuding tree. Their efforts were actively seconded by the natives; and in a short time it was discovered that the supply, of which some doubts had at first been entertained, was almost inexhaustible. It is singular, remarks an acute observer, that, although the Portuguese, Dutch, and English, had, one or other of them, retained possession of the islands on which the trees grow for more than nine centuries and a half, it should have remained for an Englishman to discover their valuable properties at so late a date as 1843.

The rise of this new trade gave a great impulse to the activity of the Oriental islanders; and the value of the gum becoming fully known, eager search was made from island to island, and among the forests of the Archipelago; and large profits were made by the sarmingongs, or chiefs, of the aboriginal tribes, who exacted from the gum-hunters a royalty on all they found. Sufficient profit, however, was left, even after this deduction, to stimulate the cupidity of the natives, and the port of Singapore was speedily supplied with the article in great quantities. At present, above two millions of pounds are exported into this country in the many-shaped masses alluded to. We will now inquire into

THE NATURE AND APPLICATIONS OF GUTTA PERCHA.

At the present time the chief supplies of the article come from Singapore, though vast numbers of the tree—the wood of which, being of a soft spongy nature, is of little commercial value—are found in Borneo, Java, Sumatra, and Penang. In its nature it differs from indian-rubber chiefly in its superior density and toughness. Though both substances are somewhat alike in appearance and manner of application, the absence of oxygen in indian-rubber may account for its greater elasticity. The chemical constituents of gutta percha, as ascertained by Dr. Maclaghan, are—

Carbon	86·36
Hydrogen	12·15
Oxygen	1·49
	—— 100

While those of indian-rubber are—

Carbon	87 2
Hydrogen	12·8
	—— 100

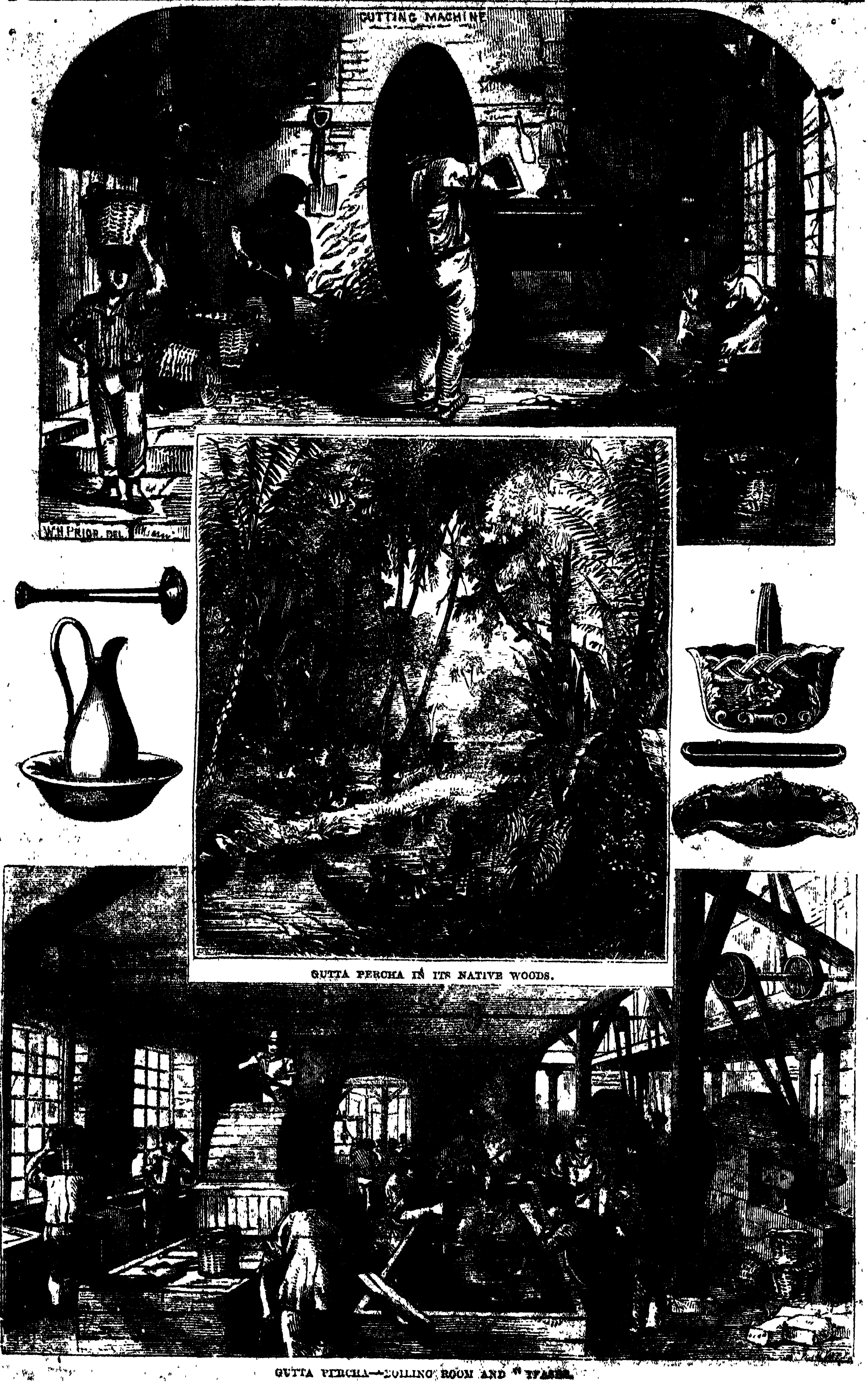
Exposed to a temperature of 248 degrees, gutta percha melts; and in cooling remains in a semi-fluid adhesive state—partially decomposed, in fact; and when set on fire it burns very readily, with a dense smoke. At a temperature of about 200 degrees it becomes soft and ductile, though without stickiness, and can be put into the shape it is intended to retain when cool. Its specific is ·975, that of water being 1·000. It is repellant of, and completely unaffected by, any description of *cold* water; and of heat and electricity it is a non-conductor. It is proof against alkalies and acids, being only affected by sulphuric or nitric acid in a highly concentrated state; while the most powerful ascetic, hydrofluoric, or muriatic acids, or chlorine, have no effect whatever on its structure or capabilities. Of its power to resist frost, sufficient proof exists in the number of boot and shoe-soles manufactured from it; and of its acoustic properties we shall have more to say.

The capabilities of the resin were tested as soon as the specimen forwarded by Dr. Montgomerie reached London, and a kind of historical interest is attached to this sample from the fact that, from this humble beginning, a large branch of manufacture has arisen which now employs some thousands of workmen. Several ingenious tests were applied to the specimens, and it was soon proved, by Messrs. Whishaw and Hancock, that it was applicable to a vast number of purposes; and from it were made tubing, lathe-bands, and impressions of medals—all of which were shown at the late Exhibition in Hyde Park. If further proofs of its value were necessary, we need only refer to the experiments made by these gentlemen; one of which consisted in the softening a mass of the material in hot water, pressing it round a soda-water bottle, hardening it in cold water, pressing it out into a thin sheet, and then, by the application of heat, again rolling up the gum into the form at first assumed. From the patents taken out by Messrs. Hancock, arose the manufacturing and trading firm known as the "Gutta Percha Company."

We will now examine

THE MANUFACTURE OF GUTTA PERCHA.

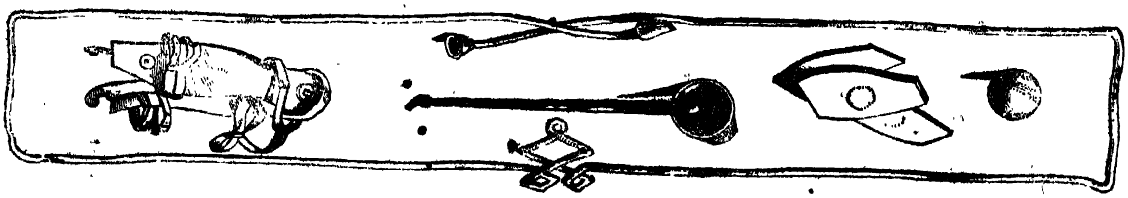
Perhaps few of our readers think what a vast amount of capital and labour are constantly working hand in hand in the byways of this great city. We pass through the main streets, and are acquainted with the general complexion of the thoroughfares right and left, but, without our business lead us directly into the vortex of industry, we bestow little thought upon aught that comes not immediately before our eyes. A few steps out of the main line in one direction take us into the midst of the tan-yards of Bermondsey; a hundred yards or so from Finsbury-square, and we are in a new world among the weavers of rich silken and velvet stuffs; through a street or two from that same square, and we are deafened by the clang of hammers and the din of labour; in every direction, did we care to search, we should



GUTTA PERCHA IN ITS NATIVE WOODS.

GUTTA PERCHA—BOILING ROOM AND “TEASER.”

GUTTA PERCHA—ROLLING MACHINE AND TANK.



find factories where hundreds of men earn the "daily bread" for which, it is to be hoped, they nightly pray. So it is with the spot in which the Gutta Percha Company have their factory. A few yards out of the City-road, near the canal basin, and we find ourselves in a strange neighbourhood, where coals, and lime, and culm, and building materials, are being constantly unloaded from queer-shaped vessels, and where numerous manufactures are being carried on. In this "Wharf-road" are the works we are now visiting.

We enter a modest-looking doorway beside a pair of folding gates, on which the words "Gutta Percha Company" are painted, and we become speedily aware that a branch of manufacture of which we hitherto knew next to nothing is being carried on within. Sight and smell—a smell something like a tan-yard, something like old cheese, something like half-dried clothes in a laundry, something like gas tar—an odour we soon become accustomed to—informs us that we may expect to witness a new sight. And we are not mistaken; for the manufacture of gutta percha has necessitated the invention and use of novel machines, strange processes, and odd-looking tools. Every fresh application of the material—whether it be the production of merely useful or highly ornamental designs, the imitation of the grain of wood, the close texture of papier-maché, or the endeavour to make this Eastern gum a substitute for leather—has obliged the invention of tools not hitherto thought of, and the use of appliances without the range of the ordinary workman. As soon as we are fairly in the yard of the works, we look around and read the history of the manufacture all about us. Here are piled great heaps of the raw material, in all imaginable strange shapes; there, and on every side, are buildings erected especially for the processes to be carried on inside—store-rooms, engine-houses, workshops, a quay for unshipping the gum, *cum multis aliis*.

Let us enter the building nearest us, and, by the help of Mr. Statham, the intelligent manager, and "our own artist," we will endeavour to explain what we witness. The blocks of gutta percha required for use are taken from this heap to the cutting machine. This is a large solid vertical disc of iron, making about two hundred revolutions per minute. The raw material is cut into thin slices by several sharp knives, like those in a carpenter's plane. The block of gutta percha, being brought to the edge of a sloping iron table, is rapidly caught up by the knives, and literally reduced to shavings, which fall into a receptacle beneath. The cutting apparatus, as well as the other machines on the premises, is put in motion through the agency of two fifty-horse power engines, the boilers of which are constructed on a novel plan, by which eleven pounds of water are evaporated to one pound of fuel. The furnaces, moreover, consume their own smoke. A reference to the engraving will convey a good idea of the appearance of the cutting machine; and we may remark, in passing, that the stone and other adulterative material which the cupidity of the Malay gatherers has added to the mass, is discovered by this process, often very much to the injury of the cutters.

Reduced to shavings, the gutta percha must next be perfectly cleansed of its impurities. This is no easy matter, but patience and hot water are certain at last to effect the desired object. The shavings are thrown into great tanks and boiled, and then, the greater part of the rubbish having fallen to the bottom, the gum is collected into one mass and carried to what is called the "teaser"—a sort of large circular box, containing a cylinder or drum, covered entirely with rows of bent, jagged teeth. Revolving at a great rate (about 800 turns in a minute), the "teaser" quickly tears the mass into shreds and tatters, which fall into a vat of water beneath. The true gutta percha, being lighter than water, floats on the surface, while the impurities sink to the bottom; and thus, being perfectly cleansed of all impurities, is ready, crisp and new-looking, for the succeeding process. Another boiling brings the material again into a soft, compact mass, which is "kneaded" or "masticated" in heated iron cylinders, in which revolving drums so completely turn and twist the pasty gum as to bring it into a perfectly homogeneous state, without a particle of water in its composition.

In this state the gutta percha may be considered ready for manufacture, and the subsequent processes are employed either in making it up in sheets or tubes. If required for after use in the production of ornamental articles, the kneaded mass is carried to the rolling machine. This apparatus is similar to that employed in paper-mills, the gutta percha passing on an endless band through steel cylinders placed at the requisite distances apart, according to the thickness of the sheet required. By a simple adjustment of the cylinders, it can be made to produce with equal ease the stoutest driving-band or the thinnest tissue so much used and appreciated by surgeons as a substitute for oiled silk, hydropathic bandages, &c. During the passage of the sheet through the machine, it has become sufficiently cooled to form a solid consistent body; or if the substance of the sheet required be too thick to allow it to cool in the ordinary manner, it is blown upon as it passes on to the drum at the end by a series of fans, like those in a winnowing machine. When the material is required to be in strips, a very ingenious construction of knives takes the sheet just before quitting the machine, and cuts it into longitudinal bands of the required width, which are, as before, carried forward on to the drum.

In the production of tubing, a different but highly ingenious and simple process takes place. "A mass of the softened material is forced by a piston through a steel cylinder, terminating in a mould, which consists of a solid circular piece of metal set within an iron tube, the space between the two being the thickness required;"—in fact, this is a very curious modification of the wire-drawing process. The gutta percha, after having left the mould in a tubular form, is received into a canal of water about fifty feet in length. The office of the water is to prevent the tube from contracting or collapsing; the pressure being equal both within and without, it is thus preserved in the required shape, and is afterwards dried and hardened by exposure to the air. As the tube leaves the water it is wound off at the other end, and the "feeding cylinder" is so contrived that no pause occurs in the transmission of the material. By this means a pipe of upwards of 1,000 feet in length has been manufactured in one piece.

From the sheeting and tubing thus prepared an infinite variety of articles are composed. The numerous workshops are crowded with men and boys engaged in various operations. In the cutting and stamping room the paper-cutting machine, invented by Mr. Wilson, is brought into extensive operation, moulds of every description being used to produce the different articles; and so great is the demand for new combinations of gutta percha, that scarcely a week passes without some addition to the stock of curious contrivances—some unique pattern, some elegant design, or some useful appliance. As we said before, the novelty of the manufacture has introduced a vast number of curious-looking tools, &c.; but it may be affirmed that the principal and indispensable necessaries are, boiling water, the knife, the mould, the press, and the plastic hand of the workman. The operation of the cutting machine is as instantaneous as it is curious. If shoe-soles are required, the band is applied to the machine, and a dozen pieces of one shape is the result; if line or string is wanted, a series of sharp knives press down on the material, and the necessary quantity is ready for the workman's hand to roll and polish; and so of every article in which a distinct outline is necessary.

The next process is the moulding, or stamping. The sheets are cut into pieces, and each piece is warmed sufficiently to take the impress of the die. These moulds, many of which display great ingenuity and originality, are all made on the premises, and constitute a distinct branch of the company's operations. We come now to speak of

THE USES OF GUTTA PERCHA.

The most important use to which this material has been applied is undoubtedly that of tubing. The history of water-carrying is the history of civilisation. First the spring at which the wayfarer stooped to drink; then the rude passage formed of trunks of trees laid end to end; then the aqueduct, carried o'er hill and valley to imperial Rome; then the gay, splashing fountain, with its retinue of water-carriers; lastly, the leaden pipe, which does its office stealthily beneath the earth, and bears the stream from distant country places into our very homes. But even the reign of the leaden pipe is doomed, and must give way in turn to gutta percha. Even while we write, the system of supply for large cities is undergoing change, and medical men are beginning to perceive that the conveyance of water in leaden pipes is hurtful to the health. "Many serious and alarming disorders," says Dr.

Thomas Smith, "such as mania, epilepsy, sudden death, nervous affections, paralysis, consumption, hydrocephalus, heart disease, &c., owe their origin in some instances, their intractable character in others, to the gradual and continuous infinitessimal doses of lead, copper, &c., introduced into the system through the channel of our daily drink." For all sanitary purposes the gutta percha tubing is admirably adapted, as it possesses strength, purity, and is entirely unaffected by frost. It is accordingly extensively used for pump-barrels, ship-pumps, feed-pipes for locomotive engines, syphons for mines, suction-pipes for fire, garden, and washing engines; and, being unaffected by acids, is available for bleaching and all chemical purposes. It may be united to a metal pipe without difficulty; is unhurt by gas or chlorine; and, as for strength, it has been found to resist a pressure of 200 lbs. to the square inch. At New York a gutta percha pipe of 1,000 feet in length, and of but two and a-half inches calibre, has been laid down for conveying the Croton water from Blackwell's Island. Its durability has been proved by the fact of its having lain in damp ground quite uninjured for two years, and its ductility is seen in the fact that it may be bent, twisted, or coiled in all directions without injury. A curious and valuable use has been made of the gutta percha tube in illuminating buildings. One end being attached to a gas-pipe, and the rest coiled round a cylinder, the light may be carried about by hand to any part of the building, the tube being coiled and uncoiled at pleasure.

Formed into carboys, flasks, funnels, bowls, scoops for ladles, linings for cisterns, battery-cells, buckets, troughs, or syphons, the Indian gum answers its purpose equally well, and is found far more strong and economical than any material hitherto tried.

In acoustics the gutta percha tubing has been found of admirable service; and, whether employed as an ear-trumpet for the deaf, as a speaking tube in a railway carriage, a domestic telegraph by which messages may be conveyed from one part of the house to another, and whereby the lowest whisper is distinctly heard; a speaking apparatus from the mouth to the lowest depths of mines; or as an appliance whereby a minister may address the deaf among his congregation—it has been found equally certain and unfailing. In various churches and chapels it has been applied to the latter purpose, being conveyed under the flooring from the pulpit to the most distant pews; and in more than one instance it has been attached to the doorway of the medical man, and carried up to his bed-side, so that he is enabled to communicate with the messenger of his patients as readily as if he attended them in person in the cold night air.

For shoe and boot-soles it has been extensively applied, and numerous testimonials speak of its efficacy in resisting damp, and protecting the feet from cold and frost in all situations. As a substitute or addition to leather for these purposes it is undoubtedly of great and important use.

We would willingly speak at length of its services in telegraphic communication; but when we say, as is already known to all our readers, that through its agency the British Channel has been spanned, and Paris, and Berlin, and Brussels have been brought within speaking distance of London; when by a flash of lightning the submarine telegraph conveys intelligence from shore to shore, we think we have sufficiently testified to its usefulness and importance in this respect.

As a decorative and fine art material, gutta percha has been brought into use in an immense variety of ways. In gutta percha are formed all manner of domestic appliances and ornaments—trays of all sorts and sizes; vases, watch-stands, and plates; bouquet-holders, statuettes, brackets, jugs, mugs, inkstands, and clothes-lines; flower-pots and stands, paper-weights, medallions, cornices, doors, mouldings, picture and glass frames, drinking cups, fishing nets, and portmanteaus; skates, policemen's batons, and boats; oil-cans, washing basins, and whips; stethoscopes, splints for dislocations, and curtain-rings; stuffing for horses' feet, mill-bands, and stop-cocks; cutting boards, cabmen's hats, and traces; life preservers, bottling boots, and seals; powder-flasks, air-guns, and book-covers; sponge-bags, galvanic batteries, and bandages for broken limbs;—when for all these, and thousands of other purposes, it has been found of eminent utility, enough has been said to commend it to the reader's attention. It may be mentioned, in conclusion, that many imitations and falsifications of the company's patent have been attempted, to obviate which the name and offices of the patentees are now stamped on all articles issuing from their establishment. We could go on, but space forbids. To the stranger in London, and the seeker after novelty in manufactures, an hour or two cannot be more profitably spent than in visiting the works of the Gutta Percha Company. Much that is useful, much that is curious, and much that is beautiful, awaits his inspection.

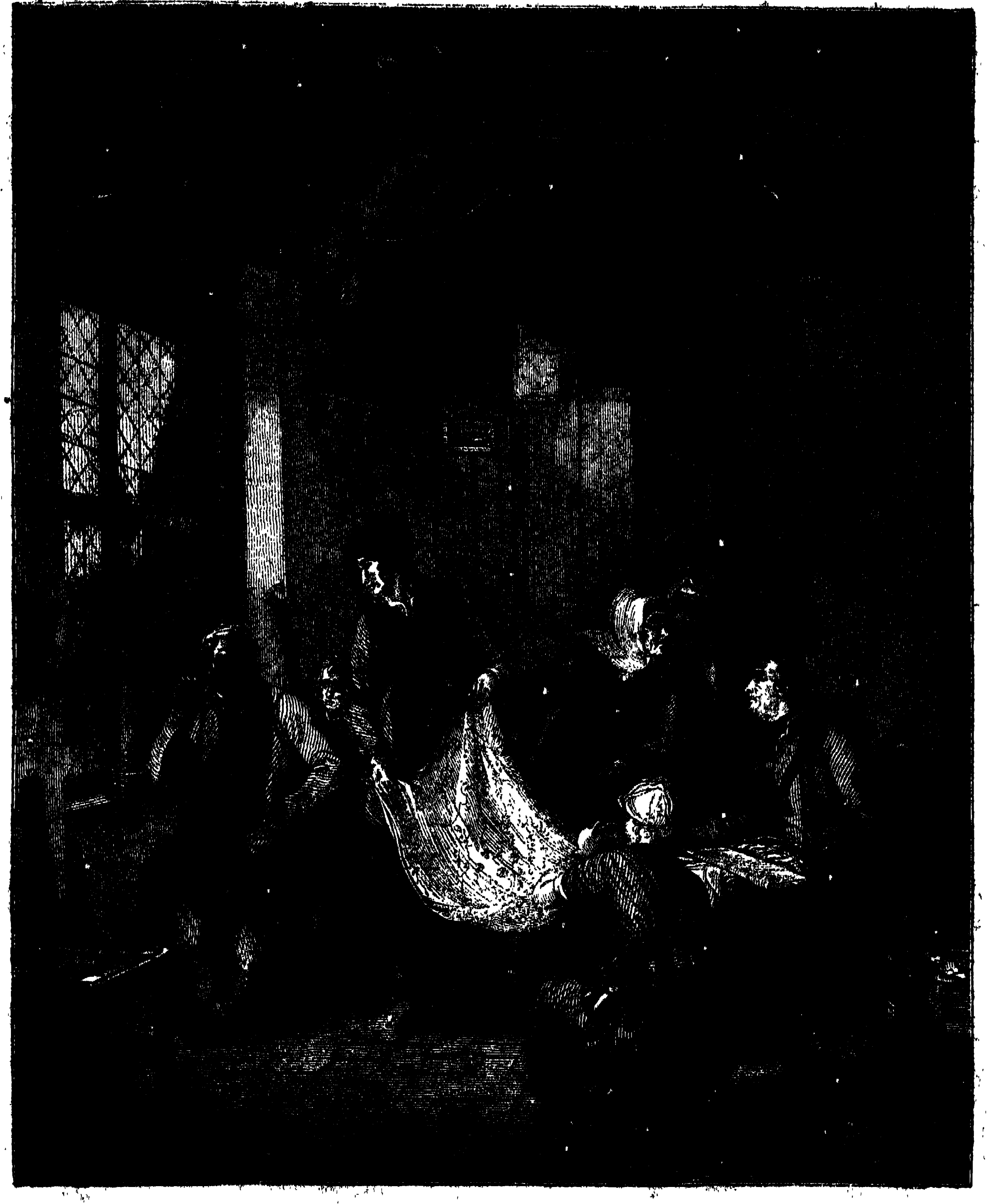
THE WORKS OF THE GREAT MASTERS.

THE PEDLAR.

The Pedlar—the itinerant hawker of various wares—has for centuries been known as the type of a certain class of considerable importance in our commercial community. Many a wife, and many a maiden too, looks forward to the periodical visit of the "Packman" with almost as much eagerness as they wait the arrival of the postman who is to bring them news of a husband or a lover, "over the hills," it may be over the seas, "and far away." The visit of the Packman is welcomed, and his stores are curiously examined and readily purchased. The result is a supply of useful articles to those who live at a distance from towns, and a gradual acquisition of wealth to the travelling merchant; so that, by degrees, he is enabled to relieve his back of its wonted burden, and to deposit his wares in a neat covered cart, or chaise, till, his business still increasing, he starts a handsome four-wheeled van, with a pair of stout, good-looking horses; he mounts a snug seat in front with an assistant or driver seated at his side, or placed as a guard in a snug nook at the back of his vehicle.

In new and nascent countries especially does the Pedlar occupy a most important station. Welcome indeed is his distant form to the colonist and his family, as they are toiling painfully to transform into a garden the fertile, though hitherto neglected lands, where their new home is chosen and planted. In the United States of America, for example—those States which have now become like one vast heart, or workshop—there were for a long series of years hardly any purveyors of useful manufactures save the hawkers. But the Pedlar's calling was not confined to the selling of his wares. Journeying from plantation to plantation, or from settlement to settlement, he was the bearer, and often the sole bearer, of public news, and the medium through which letters and private communications were conveyed from friends and family connections, scattered through widely separated districts. His pack often became a post-bag and a shop, and both were ambulatory. In the colonies to which we have referred, Cooper's "Spy" was in the substance of the character, and, apart from the fictitious and romantic additions and ornaments which pertain to a novel, but a type—and a very interesting type—of the transatlantic hawker of those times. The Pedlar was the pioneer of trade, and esteemed himself the equal of those whom he visited, because he was aware that he contributed their necessities and comforts. Being generally in good circumstances, he was welcome whenever he appeared, even amongst those who did not want to buy. In the majority of cases he found the private house a gratuitous hotel, where he sat at table with the family on the footing of a friendly guest.

The formation of regular towns, with well-stocked "stores"—good roads—and especially the introduction of railways and steam-carriages, by almost annihilating distance, have rendered the Pedlar's visits less necessary, and of course less frequent. But in the back settlements may still be seen the "'minished" heirs of this once prosperous and important calling. They consist now, for the most part, of sellers of books intended for the libraries of distant settlers. On the road, the American Pedlar is commonly observed to beguile his time by the perusal of some of those works which form his stock-in-trade; and he can recite from memory some of the finest passages of our English writers, as well as the literary and religious productions of the West. On the Continent, many religious societies have availed themselves of the services of the Pedlar, or *Colporteur*, for the purpose of disseminating their principles through the medium of tracts and other publications, which he is instructed to sell, or to bestow gratuitously, as circumstances may dictate.



THE PEDLAR.—AFTER THE CELEBRATED PICTURE BY WILKIE.

But such as the Pedlar, or Hawker, is, in various parts of the United Kingdom, he is depicted in our engraving from the well-known picture of the celebrated DAVID WILKIE. That close observer and admirable delineator of nature, has described a scene familiar to our rural population, and not unfrequently enacted in suburban districts.

The Pedlar is seated, and has successively unrolled his most seductive wares. At length, a flowered chintz dazzles the eyes and bewitches the heads of the "womankind." The aunt, safe from detection in the background, lifts her hands in ecstasy. A neighbour, kneeling down, holds the chintz between the light and her eyes, to ascertain its tissue and firmness. The "old woman" (the mother), who, "spectacles on nose," prosecutes the inspection, is evidently discussing the price. She is asking for an abatement; and there is no mistaking the gesture and general manner of the Pedlar: "*He really cannot; he would if he could.*" The daughter says nothing, but, holding the article with both hands she turns round towards her husband; and her face is like a note of interrogation. The child, standing behind the father's chair has an uneasy and entreating air the little rogue is plainly in a story with his mother—he is her accomplice. The head of the family still hesitates—and still smokes; he is half on a smile, but wants, if he can, to grumble. His hand, thrust into the pocket of his jacket, appears to fumble with the purse, which he must empty. Yes, he must empty it; and he will.

But why need we particularise? Does not this beautiful engraving from a charming picture tell its own tale?

ARCHITECTURE.

DOVER CASTLE.

Most of our readers, we presume, have heard of DOVER CASTLE, and many of them, we doubt not, in these locomotive times, have wandered within its walls, and gazed on its ruins hoar and grey. Under these circumstances, it is desirable we should attempt briefly to tell its story.

Like most castles, that of Dover has arrived at a ripe old age. Its origin lies far back in the annals of our land. Common tradition supposes that Julius Cæsar was the builder of the castle. The more probable supposition, we think, is, that it was reared by Plautius, a general sent with an army into Britain by the Emperor Claudius. Our old topographical writers, however, are strongly in favour of Julius Cæsar's claim to having built it. Kilburne says there was a tower here called Cæsar's Tower, and he further states there were to be seen there great pipes and casks, bound with iron hoops, in which was liquor, supposed to be wine, which by long lying had become as thick as treacle, and would cleave like birdlime; salt congealed together as hard as stone; cross and long-bows, and arrows to which brass was fastened instead of feathers; and they were of such size as not fit for the use of men of that or any later ages. These the inhabitants showed as having belonged to Cæsar, and the wine and salt as part of the provisions he had brought with him hither. Modern writers hint that the wine would not have kept so long. Camden relates that he was shown these arrows, which he thinks were such as the Romans used to shoot out of their engines, which were like large cross-bows. Be this, however, as it may, Dover Castle undoubtedly may lay claim to great antiquity. Some part of it clearly is of Roman origin. The part of the country in which it was situated became a Roman province, and here, on the nearest point to the Continent, where it would command the harbour in case of a reinforcement of shipping, or secure a retreat if necessary, the Romans would necessarily erect a castle.

Dover Castle stands on a lofty eminence, about half-a-mile northward from the town, from which it is approached by a bold ascent. It occupies a site of thirty acres of land, and consists at the present time of two courts, defended by wide ditches, and communicating with the towers within by means of subterraneous passages. The lower court, excepting on the side next the sea, is surrounded by an irregular wall, called the curtain, and flanked at unequal distances by numerous towers, of different shapes and ages. During the lapse of years they have all undergone considerable alterations. That which Godwin erected in the time of Canute has long been removed, nor was its site known for ages, till a few years back, in making a new road, its site was discovered. In Godwin's time the castle was deemed almost impregnable. When Harold, Godwin's second son, who had succeeded his father in the government of the castle, made his expedition into Normandy to Duke William, to induce him to restore his nephew Hacun, the Duke promised it if Harold would give him his assistance in gaining the crown of England after King Edward's death, and, among other conditions, deliver to him the Castle of Dover with the well in it. And when the disastrous battle in which Harold was slain was fought, William, no longer mere Duke, but rejoicing Conqueror, marched directly to Dover to take possession of the castle, to which many had fled for refuge. But we must return to our description. Chelham or Caldescot Tower is the third from the edge of the cliff, and at the back of it was a postern upon the wall, which joined the Roman and Saxon works, with a subterraneous passage into the castle, through which Stephen Pincester is said to have led the reinforcement that enabled Hubert de Burgh successfully to withstand the Dauphin in the reign of John. In the front of this building is a house for an officer called the Bodar of the Castle, under the Lord-Warden of the Cinque Ports, who has power to take within his jurisdiction and custody in this tower crown and other debtors. Fiennes or Newgate Tower has been used ever since the Conquest as the governor's apartments; it stands upon the site of a more ancient tower, said to have been built after a design by Gundulph, Bishop of Rochester, who was employed by the Conqueror in making designs for castles and superintending their erection. Crevignor, Craville, or Earl of Norfolk's Tower, is opposite the north entrance of the quadrangle of the keep, and near it is a subterraneous passage leading to a vault, which is sufficiently capacious to contain a large garrison, and is protected by a drawbridge, moat, and round tower. The tower in the ditch and the adjoining subterraneous works are supposed to have been constructed in the reign of John. Fitzwilliam or St. John's Tower is the next in order. It was named after Adam Fitzwilliam, who accompanied the Conqueror to England, and received from that monarch the scarf from off his own arm, at the battle of Hastings, as a reward for his distinguished bravery. Avianche's or Maunsel's Tower stands in an angle formed by the curtain wall, and is one of the noblest relics of the Norman towers. The first floor was a kind of vault, arched with stone, and open in front; and in the wall, which is very thick, is a gallery or passage, ascended by stone steps, where archers could range one above another, and, through small apertures, command the ditch on either side, as also the approaches to it from the curtain. Through the gallery is an ascent to the platform over the top of the vault, partly surrounded by a wall, and having a spiral stone staircase which leads to the top of the tower. Near the entrance denominated the Palace Gate is a stately fabric, in Edward the Fourth's time called Suffolk Tower, from De la Pole, Duke of Suffolk; adjoining which is the old Arsenal Tower, and farther on were formerly the king's kitchens and other offices. All this side of the castle presents a modern appearance, the back part having been cased over, and the front being hid by barracks erected in 1745. The keep, or Palace Tower, erected by Gundulph, stands near the centre of the court; the entrance, originally on the east, is now on the south side; it opened by a grand portal, now walled up into the state apartments. The staircase has two vestibules, and was guarded at different heights by three strong gates. Ascending by the vestibule on the right hand is a room, apparently designed for the warden of the first gate, and opposite is another, probably the chapel, adorned on every side with beautiful arches, richly embellished. Above this is a third similarly ornamented, and under the chapel and first vestibule is the dungeon, in which have languished many of noble name and deed. In the walls of the keep are galleries, with holes, through which an enemy might be fired at, but so constructed as to protect the defenders. The second floor was intended for the use of the garrison, and the ground-floor for stores. Part of the castle is used as a gaol. In the north angle a well, for ages arched over, has been lately discovered; there are also four other wells, each three hundred and seventy feet deep, within the Saxon lines of defence. The more recent works are batteries mounted with heavy ordnance, casemates in the chalk rock, covered ways, and subterranean passages, with accommodations in them for ten thousand men, light and air being admitted through holes cut in the chalk, and other apertures, extending to the front of the cliff. Near the edge of the cliff is a curious piece of brass ordnance, twenty-four feet in length, cast at Utrecht in 1544, and called Queen Elizabeth's pocket-pistol, it having been presented to her Majesty by the states of Holland; it carries a twelve-pound shot, and it has been affirmed that, if loaded well and kept clean, it would carry a shot to the French shore.

With Dover Castle every Englishman, after all, should have proud historic associations. It was but a partial triumph Cæsar effected there. Tacitus says that he did not conquer Britain, but that he only showed it to the Romans. Horace, calling upon Augustus to win fresh laurels for the Roman arms, speaks of Britain as untouched; and, in a similar spirit, Propertius describes her as unconquered, and, in the same spirit, our national dramatist makes the Queen in "Cymbeline" proudly tell the Roman general:—

> "Remember, sir, my liege,
> The kings, your ancestors, together with
> The natural bravery of your isle, which stands,
> As Neptune's park, ribbed and paled in
> With rocks unscaleable and roaring waters—
> With sands that will not bear your enemies' boats,
> But suck them up to th' topmasts. A kind of conquest
> Cæsar made here; but made not here his brag
> Of *came*, and *saw*, and *overcame*; with shame
> (The first that ever touch'd him) he was carried
> From off our coasts, twice beaten; and his shipping
> (Poor ignorant baubles!) on our terrible seas
> Like egg-shells moved upon their surges—crack'd
> As easily 'gainst our rocks: for joy whereof,
> The famed Cassibelan, who was once at point
> (O gigot fortune!) to master Cæsar's sword,
> Made Lud's town with rejoicing fires bright,
> And Britons strut with courage."

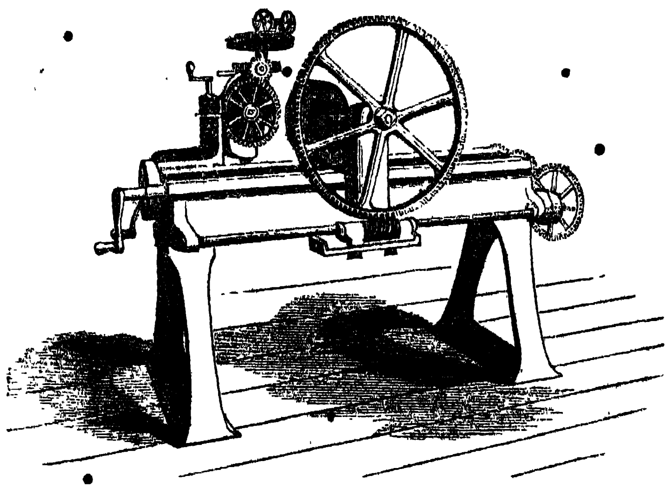
Nor was this mere boasting. On a brave people did Dover Castle look down—brave even when the Roman eagles were borne triumphant along the land, or when on a bloody battle-field the last of the Saxon kings laid cold. And though years have come and gone, and though Roman soldier and Norman baron, in their power and pride, have passed away, a people mightier than they have risen up, with a loftier aim, and a mission more divine.

Still, as of old, bristling with guns and armed men, Dover Castle watches the narrow strait that divides England from France; but there are symptoms that its destiny is accomplished. Other agencies are at work. Beneath the waves that foam around its rocky base runs thought free and swift as the lightning flash; and long be it ere War rudely snaps the bond which Peace and Science have joined to form!

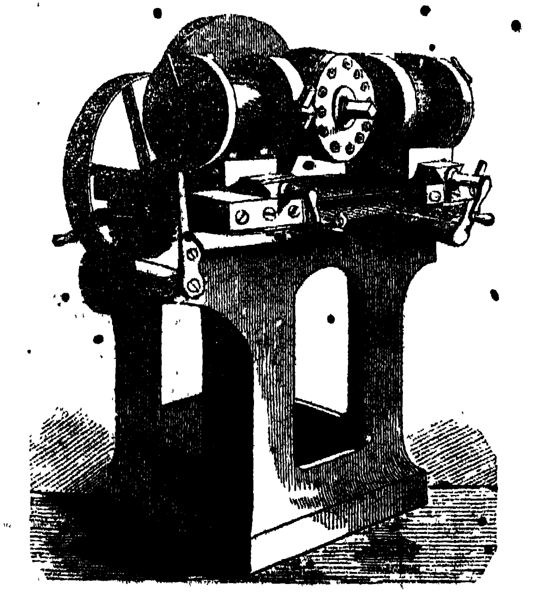
SCIENTIFIC DISCOVERIES, INVENTIONS, AND IMPROVEMENTS.

WHITWORTH'S MICROMETRIC APPARATUS AND MANCHESTER TOOLS.

In the department devoted to machinery in the Great Exhibition there was exhibited by Messrs. Whitworth, of Manchester, a collection of turning, planing, boring, and cutting machines, on a scale of extraordinary magnitude; and near them an instrument on a smaller scale, by which magnitudes so minute as even to elude the microscope have been submitted to mechanical measurement. This admirable instrument is not a mere object of scientific curiosity, but has been applied to purposes of the greatest practical utility, by affording means for the establishing uniform standards of magnitude for taps, axles, and other important component parts of machinery, among which it is as necessary to maintain uniformity as it is to have a uniform language or a uniform system of numeration. By the instrument to which we refer magnitudes are actually estimated which do not exceed the one-millionth part of an inch. Two perfectly plane and smooth metallic surfaces are first formed, partly by friction against each other, and partly by abrasion with a peculiar tool. So plane are the surfaces of metal thus formed, that, when one is laid upon the other, no one part comes into closer contact than another, and there is included between them a stratum of particles of air, which act like infinitely smooth rollers, and the surfaces move in contact one with another with a degree of freedom, owing to the lubricity of the air, which must be felt to be conceived. If, however, the surfaces be brought so close together as to exclude the air, they are with great difficulty separated. These surfaces thus accurately formed are used as standards to test other plane surfaces, by means of a metallic bar acted upon by a rather complicated apparatus; and if, from a change of temperature or other cause, this bar suffer a change in its length amounting to the millionth part of an inch, that change is rendered perceptible. By the application of this instrument, standard gauges for axles, taps, and other parts of machinery in which it is desirable to maintain a strict uniformity, are constructed with unerring fidelity.



COG-WHEEL CUTTING AND DIVIDING MACHINE.—MESSRS. WHITWORTH AND CO., MANCHESTER.

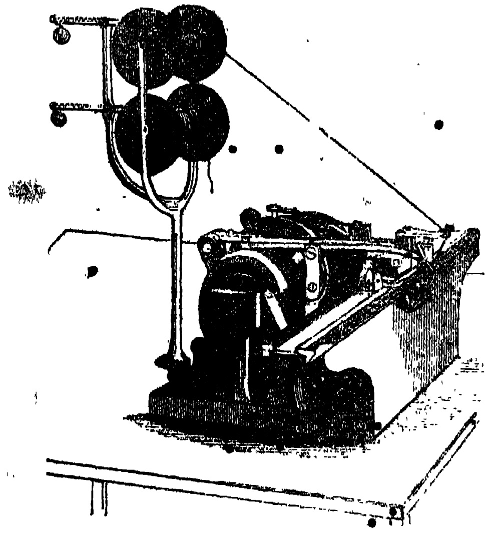


BOLT HEAD AND NUT SHAPING MACHINE.—MESSRS. WHITWORTH AND CO., MANCHESTER.

Our first engraving shows the Self-acting Cog-wheel Cutting Machine; it is what is called the D size, and is used to cut, bevel, spin, and worm wheels to 4ft. 6in. diameters and 9in. in width. It both divides the distances and cuts the cog. It moves horizontally for different diameters of wheels, and is used extensively by the makers of cotton machinery. Messrs. Hibbert and Platt have long since availed themselves of its services.

The Self-acting Bolt Head and Nut Shaping Machine, seen in the engraving, with double cutters to square two objects at a time, is used principally by manufacturers of locomotive and marine engines. It cuts and shapes the hexagon nut. By the old method only one side of the hexagon was formed at a time; by this ingeniously-contrived machine two heads are cut at the same moment, and both sides of each hexagon.

The Patent Knitting Machine, though small—measuring little more than 19in. in length and 12in. in height—is likely to prove extremely useful. It knits one stitch at a time, and produces 420 stitches per minute. It can be worked by either hand or steam power, and one girl can attend four machines. The original idea of a machine to produce knitted work of a similar character to that of hand labour, was formed, and a model machine executed in wood, by a Mr. Wild, an Englishman, residing, we believe, in the United States. The present machine is an improvement on the above, executed and patented by the Messrs. Whitworth. The object of the lower bobbin shown in the engraving is to apply an additional thread for the purpose of strengthening the heel of the stocking



PATENT KNITTING MACHINE.—MESSRS. WHITWORTH AND CO., MANCHESTER.

NATURAL HISTORY.

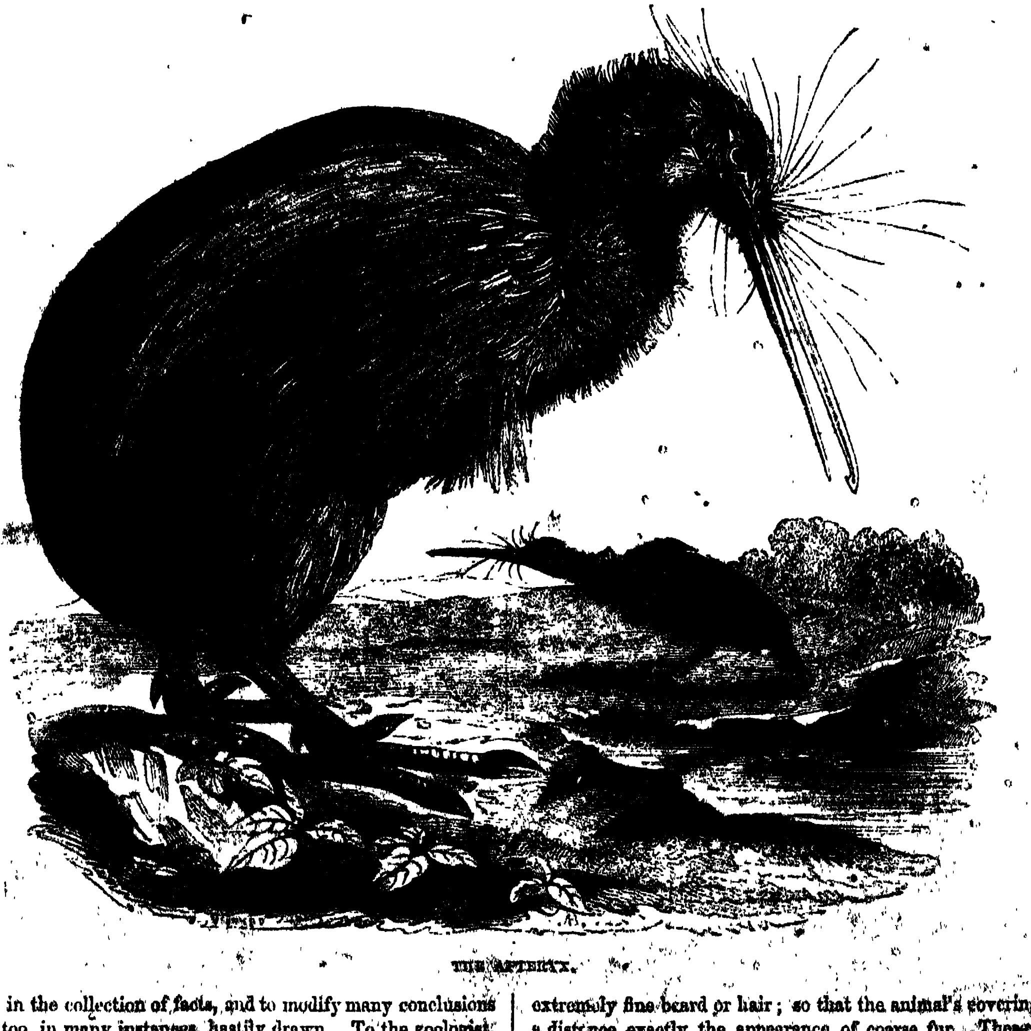
THE APTERYX.

(*Recently added to the collection in the Royal Zoological Gardens, Regent's-park.*)

The explorations of the last seventy years in Australasia and Polynesia have largely added to our knowledge in that branch of science known as *Natural History*. Animals till then unknown, and whose structure was utterly opposed to all previously-received notions of animal physiology, were discovered in great numbers: such as the kangaroo and ornithoryncus. The former has a pouch for to serve as refuge for its young, in consequence of their being born in a very premature state of development; and the latter is an animal of the genus *mammalia*, with a duck's bill. It was difficult to say to what head in the old system of classification such anomalies as these should be referred. So that it was necessary to extend it vastly, to exercise greater diligence and care in the collection of facts, and to modify many conclusions perhaps too, in many instances, hastily drawn. To the zoologist, therefore, the discovery of the islands in the South Pacific has opened up a new and most interesting field of research: and one of the strangest of the many strange things which here meet us is the *Apteryx*, so called from two Greek words meaning "wingless."

For a long time nothing was known of this singular animal, except what could be learned from some remains brought over by the voyager, Shaw. But, notwithstanding the statements made by him, and the evidence afforded by the bones, &c., which he produced, it was believed by most naturalists for nearly forty years, that no such animal had ever existed, and that the object of Shaw's description was but a penguin or some similar bird, the characteristics of which had been exaggerated or softened down, as suited the purpose in view. At length Lord Derby presented the remains in question to the Zoological Society, by whom they were made the subject of the most careful investigation, and a detailed description published. Scarcely had this been done, before the bodies of five of the birds arrived in London, some of which were preserved, and others dissected. This led to a much clearer knowledge of the species.

Although it is quite true that the Apteryx has no wings, yet there are small members, not half an inch in length, growing out of the spot in which the wings ought to be, if we may use the expression. The feathers are soft and flexible, and furnished with extremely fine beard or hair; so that the animal's covering has a a distance exactly the appearance of coarse fur. These characteristics are quite sufficient to warrant us in referring it to the family of birds known as *Cursores*, or *Runners*, such as the ostrich and cassowary, and perhaps the extinct *dodo*. But the Apteryx differs widely from the general structural type on which all these birds seem in sort to have been modelled. As it is *insectivorous*, or insect-eating, its bill is long and attenuated like that of the curlew, to enable it to root up the eggs of the beetles and caterpillars on which it lives. The eyes are very small, and protected by a contractile member. The head also is very small in proportion to the size of the body, which is that of an ordinary hen; and the nostrils are surrounded by fine hairs, like the whiskers of a cat. The legs are long and powerful, and in pro-

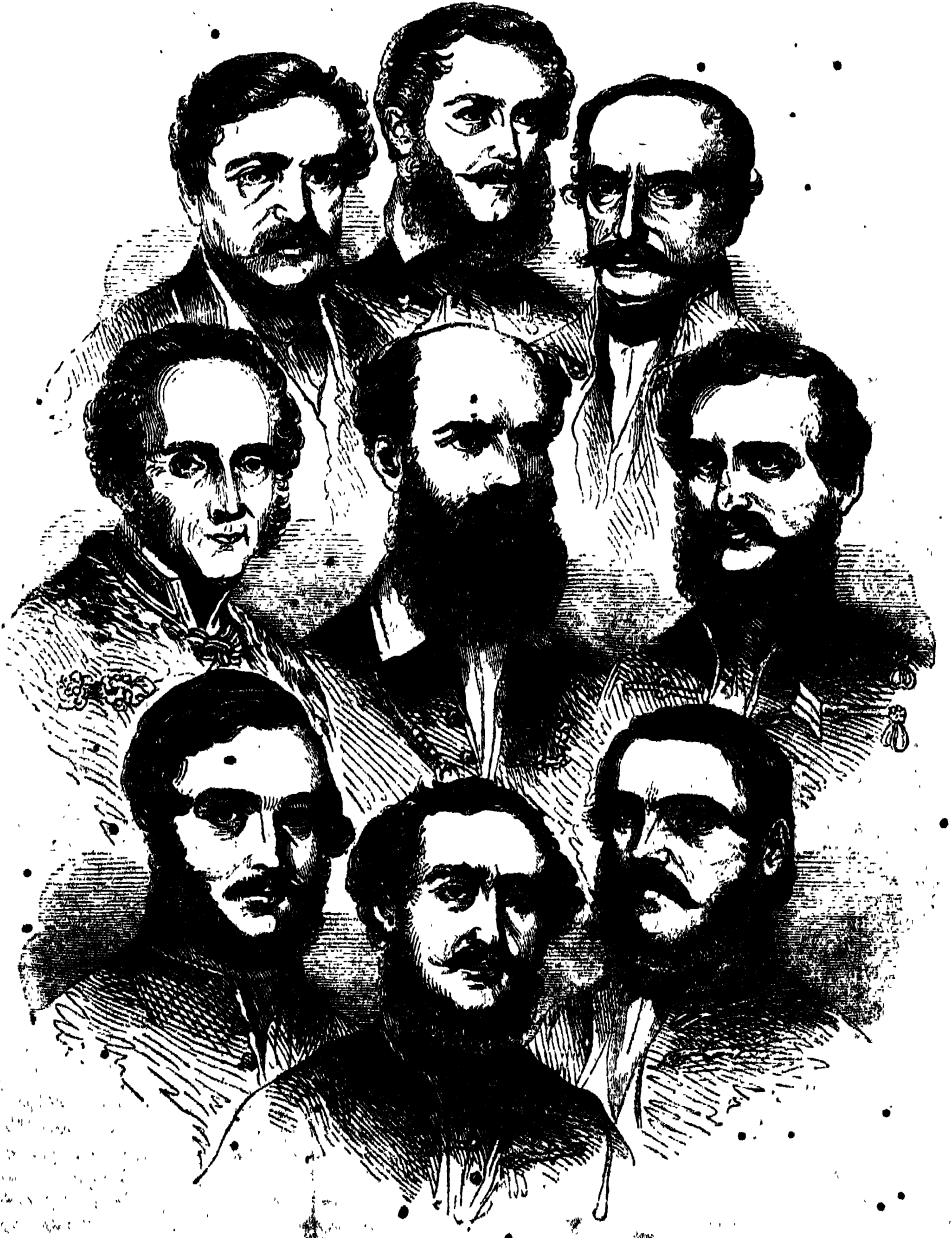


THE APTERYX.

portion to the size of the bird much stronger than those of any of the other cursores, and admirably adapted for rapid progress by means of extended leaps.

By the natives of New Zealand it is called "kiwi," and they hunt it for the sake of its flesh, of which they are extremely fond. The Apteryx is seldom found moving about in the day; until the approach of night it buries itself in the recesses of the forest, and then ventures forth in couples in search of food, which it discovers in the darkness with the greatest ease. Its cry resembles the sound of a whistle, and it is by imitating this that the hunters are enabled to take it. It is sometimes chased by dogs, and at others secured by suddenly coming upon it with a lighted torch, and, being thus dazzled, it makes no attempt at flight; but it on all occasions defends itself with great vigour, by means of its legs, a single stroke being often sufficient to inflict severe injury. Like all other wild birds which have not the power of flight, it is now becoming extremely rare, and is never seen but in remote solitudes. A live specimen has at length reached England in safety a few weeks ago, and is now deposited in the gardens of the Zoological Society.

THE PORTRAIT GALLERY.



THE FIRST MAGYAR MINISTRY IN [illegible]

Francis Deak.
Prince Paul Esterhazy.
Baron Joseph Eotveos.
Louis Kossuth.
Louis Batthyanyi.
Stephen Szechényi.
Lazarus Mésáros.
Bartholomew Szemere.
Gabriel Klauzál.

For many years previous to the late struggle in Hungary, it was evident that she could never enjoy peace and prosperity under Austrian rule. No man can serve two masters, nor can any man pursue two opposite lines of policy without suffering either of them to clash. In Vienna the Emperor of Austria was an absolute sovereign, ruling by his will alone; in Pesth he was a constitutional king, bound up by established laws, and compelled to act in harmony with the Diet. Under such circumstances, he would naturally seek, as far as possible, to assimilate the institutions and mode of government in the two countries. But the traditions and hereditary policy of his family, and his own love of power, were utterly opposed to his granting representative institutions to Austria. No member of the Hapsburgh family was ever known to suffer any limits to his power to exist longer than he could help. All the bulwarks of popular liberty in the other states of the Austrian empire had been long ago destroyed; and it was determined that in Hungary also they should speedily be removed, and that she should become in all respects as Austria was; so that, wherever the black-eagle standard floated, life and limbs, liberty and property, should rest at the disposal of "His Imperial Majesty." There should be no division of authority—no divided allegiance. "*Aut Cæsar, aut nullus*," was his motto. "I will not," said he, "hamper and fatigue myself by attempting to adapt my policy to two states of things differing so widely. There must be perfect unity and perfect uniformity all over my dominions." Thus, too, had every member of the House of Hapsburgh spoken for two hundred years.

In the pages of THE WORKING MAN'S FRIEND we have been endeavouring to give some account of the various aggressions committed by this family upon Hungarian liberty. From time to time they had met with greater or less success. The Magyars had protested, petitioned, and remonstrated, and received such answers as best accorded with the strength and security of the Government for the time being.

When the storm of revolution broke over Europe in the early part of 1848, and the people of Vienna rose and compelled Metternich to fly to England, the Assembly of Posonia seized the opportunity of laying their grievances before the throne, and demanding redress. Kossuth, Louis Batthyányi, Stephen Szechényi, and Joseph Cziráki, were sent as a deputation to Vienna for this purpose. After their departure, a number of young men, called "jurats," or law-students, who assisted the deputies as secretaries, formed the resolution of flying to the assistance of the Viennese, whom they imagined to be still engaged in an armed struggle with despotism. It was midnight on the 14th of March; the city was buried in the profoundest repose; the fighting was over, and the cause of liberty had triumphed. The inhabitants were resting in sleep after the fatigues of the barricades; here and there, from hospitals and private houses, a light shone dimly into the dark street, from the chambers where tender affection was watching by the weary couches of the wounded; and in the recesses of his palace, the perjured tyrant groaned with chagrin at his defeat, and hungered, hyena-like, for more blood. Suddenly the sound of military music was heard—the measured tread and wild hurrahs of armed men. The people rushed to the windows, thinking it was a reinforcement to the cause of absolutism come to renew the conflict. But the March moon gleamed coldly, yet kindly, upon the national flag of Hungary; and the patriotic songs, as they rang through the still night-air, seemed like pæans chanted before the altar of freedom. The jurats had arrived, and the Emperor forthwith confided to Louis Batthyanyi the task of forming a cabinet which should possess the full confidence of the Hungarian nation; with the stipulation, however, that the Minister of Foreign Affairs should reside at Vienna.

Their return was expected at Pesth with trembling anxiety. From all the houses the tricoloured flag was hung out. Crowds promenaded the streets, talking over the news of the day, and speculating upon the probable result of the agitation. The students, writers, and others of the youthful part of the population, surrounded the doors of the building in which the Diet sat, and sought to influence it to vindicate their rights by force at once. But, confiding in the justice of their cause, and desirous that they should not be the aggressors in a struggle which must of necessity cause so much bloodshed, all such appeals were at once suppressed. The arrival of the couriers with the good news at last put an end to all doubt and difficulty.

The deputation returned in triumph and all parties hailed the Emperor's concession as the inauguration of a new era in the history of Hungary. Batthyanyi was President of the Council; Bartholomew Szemere, Minister of the Interior; Francis Deak, Minister of Justice; Prince Paul Esterhazy, Minister of Foreign Affairs, to reside at Vienna—and it will be seen hereafter that the arrangement exactly suited Prince Paul's taste; Louis Kossuth, Minister of Finance; Count Szechényi, Minister of Public Works; Baron Eotveos, Minister of Public Instruction; Colonel Lazarus Meszaros, Minister of War; and Gabriel Klauzal, Minister of Commerce.

Into the history of all that this ministry accomplished—of the noble part it played in the heroic but disastrous struggle that followed, our space will not here permit us to enter. At the head of the list stands Louis Kossuth, the Hampden of Hungary, who breasted the torrent of despotism when it ran highest and strongest; and he still lives to labour for freedom. Next him stands "his poor friend, Louis Batthyanyi," as he so feelingly called him in his speech at Southampton. Many others of his gallant companions in the field and forum wander over the world penniless and forlorn, or pine in the dark dungeons of Austrian fortresses but Louis Batthyanyi, the true, the tender-hearted, rests better in his bloody grave. In the last hour of mortal anguish, he sought to escape a felon's death by committing suicide. He was discovered when his purpose was but half accomplished, and was brought out, faint with loss of blood, and executed. As he was a brave man while he lived, his courage did not forsake him at the last hour. His dying breath was spent in instructing his wife to bring up his children in unfaltering hatred to Austria, and we believe that the wife of such a man will not prove unfaithful to a trust so sacred.

And there is Esterhazy, with his mild, courtier-like face—a prince, a nobleman, "well known in the highest circles;" but this is all that can be said of him. He is, we believe, the only one amongst these nine men who afterwards proved a recreant to the cause of his country. He denounces Kossuth through the medium of the English press, and alleges that a large section of this Magyar Ministry was the whole time distinguished by its red-hot Radicalism; that he joined it only with the view of seconding the efforts of the moderate party, and preserving the connexion with Austria. He charges his coadjutors with gross breaches of faith, and yet acknowledges that he still continued to hold office with them. In fact, he never resigned his post until holding it became dangerous—until Jellachich was advancing upon Hungary at the head of the Croats. Then, when it was the duty of a brave man to stand true to his convictions, and support the cause of justice and liberty, on which side soever he believed them to be—then he fled. And during the war he remained shut up in his castle a voluntary prisoner. When all was over, he came forth, and repaired to Vienna, to charm the senseless crowd of fashion in the saloons of the capital by the glitter of diamonds upon his embroidered coat, and to boast of his having cut the connection of the "low" vulgar, who fought so bravely, and died so well for great principles. And his son, a major in the National Guard of Vienna, immediately upon the news of the surrender of Goergey, joined the army, and flew to the scene of slaughter (for all fighting had ceased), and performed the part that an "officer and gentleman" in the Austrian service is expected to take, by sharing in the women-flogging and murders of Haynau. But the Esterhazy family has large estates, and, let men's honour fare as it may, estates must be looked to. And the Batthyanyi who writes to thank the prince for his attack upon Kossuth, is not any of the Batthyanyis who have figured so finely in Hungarian annals, but another and very different one, whose name is better known in the haunts of folly than on tented fields or in halls of council.

As a man is known by the company he keeps, so also he is known by the enemies he makes, and to have merited the slander and reviling of such men as these is the best title the Magyar Ministry could have to our respect. Truth is daily more and more gaining the ascendant over men's minds. The days are fast passing away when the merits of a cause are judged by its failure or success. Diplomatic tricks are fast falling into contempt; and History, while she holds up the Czar and the Emperor, Haynau and Esterhazy, as the representatives of barbarous force and shameless treachery, will embalm the nine names which stand at the head of this article in the memories of all future generations, as words of hope to all who fight in the good old cause of freedom.

THE LADIES' DEPARTMENT.

HAND SCREENS IN CROCHET.

(For instructions in Crochet, see page 14.)

Materials.—5 skeins of rich dark blue purse silk, 6 skeins of fine and pure gold thread; Boulton's crochet hook, No. 18; 2 yards of dark blue silk fringe, 2 inches deep; 2 yards of fine wire, and ½ yard of white gros-de-Naples. A pair of screen handles.

Of course silk of any other colour may be used, if blue will not correspond with the furniture. Green looks very handsome with gold, and scarlet with silver. The metal thread used must be of the very best description only.

Begin by making six gold flowers, thus:—26 ch., close in 19th for a round, × 7 ch., s.c. under loop, × twice, 7 ch., slip on the closing of the round—thus there are three loops in the centre one; work under the chain of the first, 1 s.c., 1 d.c., 6 t.c., 1 d.c., 1 s.c. Under the centre one, 1 s.c., 1 d.c., 9 t.c., 1 d.c., 1 s.c.; and the third loop like the first. Slip on the base of the flower, and work down the 19 chain in s.c.

Six of these flowers are to be made, and afterwards sewed on the silk, radiating from the centre, and each occupying the middle of one side of the hexagon.

For the Screen (beginning in the centre).—With the blue silk, make a chain of six, and close into a round.

1st: × 1 d.c., 5 ch., miss none, × 6 times.

2nd: × 5 t.c. on 5 ch., 5 ch., miss 1 d.c., × 6 times.

3rd: × 7 t.c., (beginning on the last of 5 ch.), 5 ch., × 6 times.

Continue in this manner, increasing the t.c. stitches by 2 at each section of the hexagon, in every round, until there are 33 t.c. in each division, always making 5 chain between. Then s.c. all round, adding the silk flowers where they occur—that is, over the 8th, 17th, and 26th of the 33 t.c. in each section. The flowers are made in the following manner:—12 ch., close into a loop at the 7th, 6 ch, s.c. under loop, 8 ch., s.c. under loop, 6 ch., slip at the stem, × 5 ch., s.c. under first loop of 6, × 5 times, * 5 ch., s.c. under the loop of 8, * 7 times, † 5 ch., s.c. under loop of 6, † five times; s.c. down the chain, and continue the round.

The gold flowers are to be worked in the same way, and attached over the centre of each 5 chain which form the corners of the hexagon. Work a chain all round, catching up the points of the flowers at regular intervals, and then work two rounds of s.c., with 3 stitches in one at the points.

Do all the crochet work of these screens rather tightly. Sew on the large gold flowers, passing the ends through the centre loop of the screens, and form a little rosette of × 6 chains, s.c. in the round, × repeated to close the middle.

To make up the Screens.—Cut out a hexagon, the exact size of the crochet, in paper, and bend the wire into the same form. Be very particular that the wire frame shall be true and correct. Cover it on both sides with white silk, over one side of which sew the crochet. It will only require to be fastened round the edges. The fringe must then be laid on, the handles attached, and the screen is completed.

If preferred, the back of the screen may be covered with silk of the colour of the crochet, as more durable than white.

LAMP MAT (IN CROCHET).

Materials.—6 skeins of white netting silk, and 3 skeins each of four shades of cerise ditto, the darkest being almost brown, and the lightest a rich and brilliant cerise. A hank of rather large steel beads, a string of short square steel bugles, and 1 oz. of fluted ditto, ½ inch long. A skein of rather fine white cotton cord, and 54 rings. Tapered, indented crochet-hook, No. 22. Begin with the darkest cerise, and do not change until the directions require it.

1st Round: With this silk work 8 s.c. on the end of the cord, and form into a round, after which 6 s.c. to secure it.

2nd (Cerise and white): × 1 cerise in the same stitch the last, 1 w., 2 cerise in 1, × 6 times.

3rd: × 1 cerise worked in the same stitch as the last two, 3 white, 2 cerise in one, × 6 times.

4th: Like 3rd, with 5 white instead of 3.

5th: × 1 cerise in the same stitch as the last two, 7 white, 4 cerise in 1, × 6 times.

6th: × 1 cerise in the same as the last 4, 11 white (the last 2 being over 2 cerise), 4 cerise in one, × 6 times.

7th: × 1 cerise on the next stitch, 13 white, 1 cerise on 1, 3 on the centre one of 5, × 6 times.

8th: Like 7th, with 15 white. Change to the next shade of cerise.

9th: × 1 cerise on next, 8 white, 1 cerise, 8 white, 1 cerise, 3 cerise on centre of 5, × 6 times.

10th: × 1 cerise on next, 8 white, 3 cerise (the second over 1 cerise), 8 white, 1 cerise, 3 in 1, × 6 times.

11th: × 1 cerise on next, 6 white, 3 cerise, 1 white, 1 cerise, 1 white, 3 cerise, 6 white, 1 cerise, 3 in 1, × 6 times.

12th: × 1 cerise in next, 6 white, 11 cerise, 6 white, 1 cerise, 3 in 1, × 6 times.

Next shade of cerise.

13th: × 1 cerise in next, 5 white, 5 cerise, 2 white, 1 cerise, 2 white, 5 cerise, 5 white, 1 cerise, 3 in 1, × 6 times.

14th: × 1 cerise in next, 7 white, 3 cerise, * 1 white, 2 cerise, * twice, 1 white, 3 cerise, 7 white, 1 cerise, 3 in 1, × 6 times.

15th: × 1 cerise in next, 11 white, 3 cerise, 1 white, 3 cerise, 11 white, 1 cerise, 3 in 1, × 6 times.

16th (Lightest cerise): × 1 cerise in the same stitch as the last 3, 13 white, 2 cerise, 1 white, 1 cerise, 1 white, 2 cerise, 13 white, 4 cerise in 1, × 6 times.

17th: × 1 cerise in the next, 16 white, 3 cerise (over 1 w., 1 c., 1 w.), 16 white, 1 cerise, 3 in 1, × 6 times.

18th: × 1 cerise on next, 18 white, 1 cerise, 18 white, 1 cerise, 3 cerise in 1, × 6 times.

19th. × 1 cerise in next, 39 white, 1 cerise, 3 cerise in 1, × 6 times.

20th: × 1 cerise in 1, 2 white, × 2 cerise, 3 white, * 7 times, 2 cerise, 2 white, 1 cerise, 3 cerise in 1, × 6 times.

21st: × 1 cerise in next, * 3 white, 2 cerise, * 8 times (the white over white, the cerise over cerise), 3 white, 1 cerise, 3 cerise in 1, × 6 times.

22nd: × 1 cerise in next, 3 white, * 1 cerise, 2 white over 2 cerise, 1 c., 1 w., * 8 times, 2 more white, 1 cerise, 3 cerise in 1, × 6 times.

23rd: × 1 cerise in next, 3 white, * 1 cerise, 4 white, × 8 times, 1 cerise, 3 white, 1 cerise, 3 cerise in 1, × 6 times.

24th: Entirely cerise, working 3 in 1 at all the six points.

25th. White and cerise alternately, a single stitch of each, with 3 in 1 at the points.

26th: All cerise, increasing, as before, at the corners.

This completes the centre of the mat. Now cover six of the rings with the darkest cerise, 12 with the lightest, 12 with the 2nd lightest, and 24 with white. They are to be done in s.c. The darkest are sewed in the centre of each side of the hexagon, with a white at each side, and two more (joined together) above it. The lightest cerise are placed at the points, the two being joined together, and one to the mat. These form the extreme points, and the other twelve are placed to connect the lightest rings with the white. The short square bugles are threaded, with some of the beads, to form a cross in the centre of each of the white rings; the other rings have a cross of beads only. All the rings are sewed together, and to the mat.

The elegant fringe round the edge is formed of the long steel bugles, connected with each other at the outer edge by a chain of 4 steel beads. The needle is slipped down them to connect them with the rings, and a single bead is threaded at the base of each. The side rings have 6 bugles each, placed at equal distances; the corners have 8; and 1 is placed where every two rings are joined.

This mat would be very beautiful if worked in white and shades of green, with gold beads and bugles.

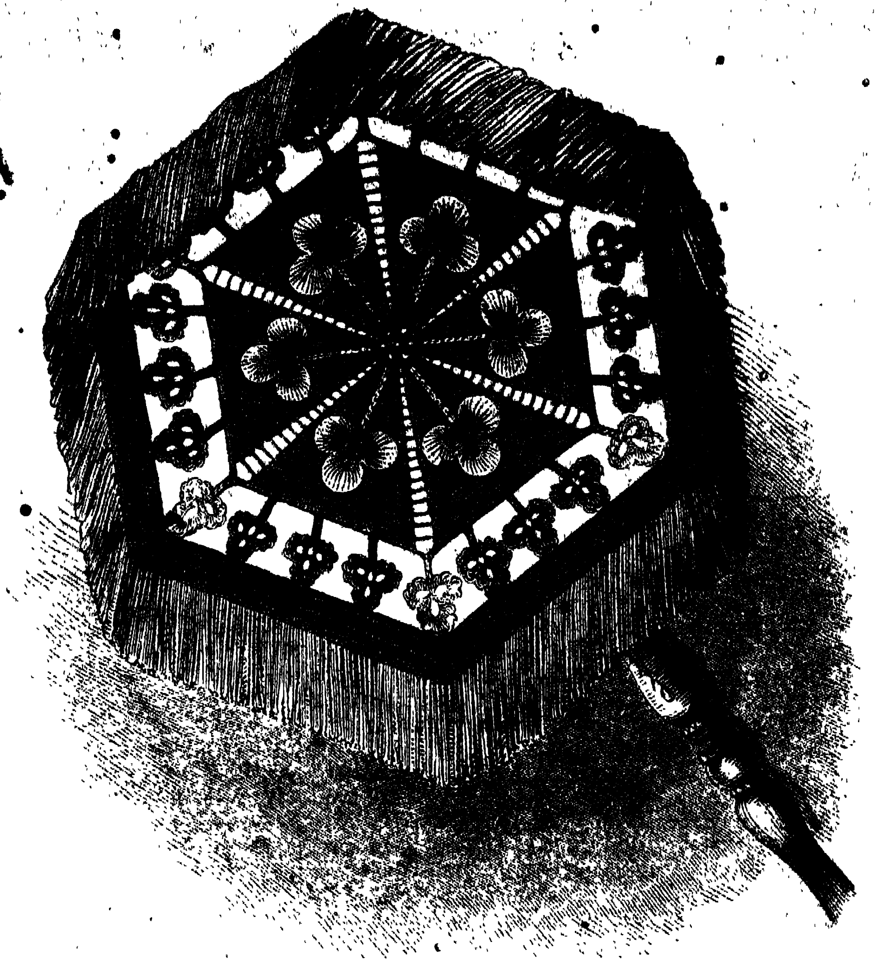
INSTRUCTIONS IN EMBROIDERY.

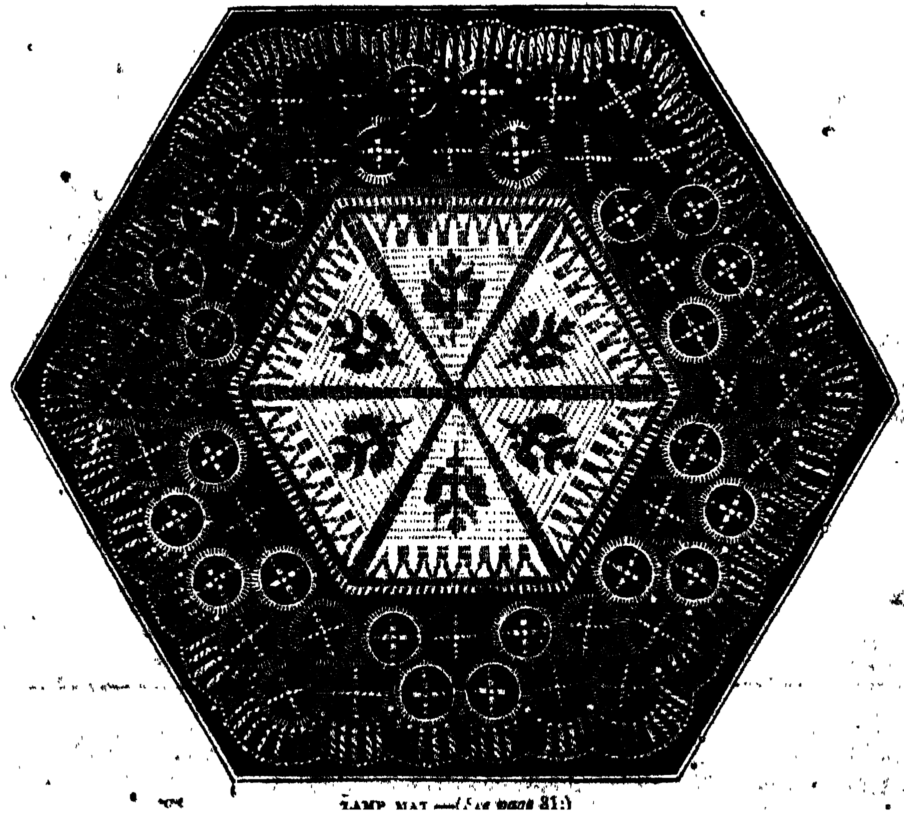
The general term embroidery includes so great a variety of styles of work, and all these styles are so ornamental, that a thorough acquaintance with them is extremely desirable to all who wish either to save or to increase their incomes.

The present style of dress is remarkable for its elaborate decoration; from the gold-and-pearl-embroidered velvet slipper, to the point-lace head-dress, scarcely an article belonging to the toilet but furnishes evidence of the skill of the needlewoman: whilst those who excel in any one branch of work cannot fail to find a pleasant and profitable employment for their time.

The first and most expensive kind of work is that on velvet, silk, leather, or any similar material, and of which such magnificent specimens were seen in the Austrian, Belgian, and Eastern departments of the Exhibition. The designs usually represent flowers, birds, or arabesques, worked in silks of various colours, intermixed with gold and silver bullion, pearls, and beads.

Another kind is embroidery on muslin or cambric, used for dresses, handkerchiefs, and an infinite variety of articles. This kind of embroidery consists partly of raised work, partly of open and ornamental stitches. The raised work is termed *satin stitch*, and is done with soft cotton.


HAND SCREEN.—(*See page* 31.)


LAMP MAT.—(*See page* 31.)

Muslin Appliqué is another style, and is at present very much in vogue. It consists of muslin or cambric laid on net, the design being in the thicker material, and the ground in net. Ornamental stitches are often introduced in this kind of work.

Braiding may be termed an inferior sort of embroidery It is very quickly done, and the effect is pretty; but, of course, it is not so intrinsically valuable as the other kinds of work.

Tambour-work, once so fashionable, is now so entirely disused, that we need only observe it was done with a small needle, resembling a very fine crochet-hook, and the pattern worked on muslin or net in chain-stitches.

(To be continued.)

HISTORICAL EVENTS.

HENRY III. AND SIMON DE MONTFORT.

English freedom is the growth of many an heroic age. It was not nursed in silken pleasures, nor born in king's palaces, but on the broad battle-field, amidst the swords of the brave and lion-hearted. As Wordsworth, in one of his noblest sonnets, writes—

> "————In our halls are hung
> Armoury of the invincible knights of old.
> We must be free or die who speak the tongue
> That Shakspeare spake—the faith and morals hold
> That Milton held—in everything we're sprung
> Of earth's best blood—have titles manifold."

If our chronicles tell of times when English freedom was withered up—when hope seemed about to leave the land—when the free man appeared on the point of becoming a serf or a slave—they can also tell how, in the dark hour of extremity, the sturdy yeoman and mailed baron rallied for the cause of right against might, and how before them quailed crowned and mitred tyranny. With us, resistance to kingcraft—that kingcraft which led one Stuart to the scaffold, and sent another to wander on the face of the earth, an outcast from his country and his throne—is not merely an abstract right, but an ancient precedent as well. The free barons of old were not the men tamely to submit to the grasping pretensions of royalty, and more than once they compelled crowned heads to be obedient to them. The feudal baron had his faults, but he had his virtues as well, and one of the noblest of them was the tenacity with which he maintained his rights against the monarch, and his firm determination to leave to his sons, in this respect, as glorious a heritage as his own.

Of this spirit we have one illustration in the collision that took place between the barons and the son of the craven John. And, in truth, such an illustration was required by the circumstances of the time. The Third Henry had broken every promise he had made. Aliens ruled the land—English treasure was squandered on them—English freedom was sacrificed to them. The people remonstrated day by day, but in vain. "Seafaring people," such was their language, "avoid the ports of England as the dens of pirates, and these pirates are but the executioners of your royal will. They despoil merchants of the articles of their traffic with such rapacity, that commerce, lately so flourishing, is quite cut off between this country and the nations of the Continent. Even the fishermen dare not bring the produce of their nets into the market-place, and are compelled to cross the Channel, and to brave the dangers of the sea, in order to escape the rapacity of your purveyors. Your acts of piety, which ought to edify your subjects, become a shameful and sacrilegious scandal in their eyes, when they know that your numerous wax-lights and silk stuffs, with which you deck the altar and the priests in your processions, have been torn from those who rightfully possessed them." But, wearied of remonstrance, they felt the time had come for action—and the hour brought the man!

Among the favourites of the sovereign was the son of that Simon de Montfort who had attained so gloomy a renown in the crusade against the Albigenses. This son, by right of his mother Amicia, held the fief of the earldom of Leicester, and came to fix himself in England, where he espoused the Princess Eleanor, sister of the King, and widow of the Earl of Pembroke. His position or name, as an alien, and the favours of the King, contributed alike to make him unpopular in the beginning. But he had the art of soon winning the good graces and the confidence of the Church and of the nobles, and became their recognised leader in withstanding the royal schemes.

The King had nominated him governor of the then English province and dependency of Guienne, in France. In this governorship his administration was marked by implacable severity, and numerous accusations were consequently preferred against him. Henry III. would have had him convicted, but in vain; and the King, in his anger, disparaged him to his face before all the court, and called him a traitor. The stigma was never forgotten or forgiven, and Simon de Montfort went from the royal presence burning with revenge. The confederated barons made him their leader. They acted wisely. It would have been impossible to have found a more fitting head.

The King having summoned, in 1258, a great council at Westminster, in order to obtain subsidies towards the conquest of Sicily, Leicester, the evening before the meeting of this *quasi* parliament, collected at his house the leaders of the clergy and nobility. Next day they proceeded in full armour to the appointed sitting. Among those present were Roger Bigod, Earl Marshal of England; Humphrey Bohun, Great Constable; and the powerful Earls of Warwick and Gloucester. The engraving accompanying this sketch gives us an idea of the scene that ensued.

As soon as the King made his appearance, the barons drew their swords, and demanded a renewed oath to Magna Charta, and the addition of twelve lords to his council, for carrying out the necessary reforms. Henry submitted. A new parliament was convoked at Oxford, on the 11th of June, 1258. There the King swore again to observe the Great Charter, and made several important concessions, known as the Statutes or Provisions of Oxford. The fulsome historians of a later age termed this "the mad Parliament."

Among other points, it was now decided that Parliament should meet, in full right, three times a year—in February, June, and October—that the freeholders should choose a new sheriff annually; that sheriffs, judges, treasurer, and Chancellor, should every year render an account of their administration; that the barons not attending the judicial sittings of the sheriffs should not be fined any more; that foreigners should no longer be appointed warders or keepers of castles; that no one should henceforth plant new forests, or let the revenues of shires. Finally, twelve persons were appointed to hold the proxies of the rest of the members of Parliament in the various sittings, so as to save the delay and expense of too frequent journeyings from place to place. It was not the day of railways.

Soon discord arose between Gloucester and Leicester, and Henry III. thought the opportunity propitious for the recovery of his property. A civil war was the consequence; and Leicester, assisted by the Prince of Wales, reduced the King to ignominious terms, concluded on the 18th of June, 1263. Again Henry made an effort, which terminated in his captivity, effected at the battle of Lewes, in Sussex.

Leicester was now absolute in England. The nobles turned against him, but he was a man of great resources, and, as if he had looked far down into futurity, he summoned the people to his side. The concessions extorted from the selfish ambition of a tyrannical adventurer were the small beginnings of the rights and privileges which the Commons of England afterwards attained. The admission of the Commons into the constitution of Parliament was not, however, made law till the reign of Edward I., in 1295, when a writ from the royal hand confirmed the new power.

Prince Edward, whom Leicester had kept as a hostage for the fulfilment of the King's enforced promises, managed to escape and to levy an army, which surprised that of the revolted peer, with the advantage of numbers and position. Leicester felt that his hour was passed, and, when he surveyed the fine appearance of the hostile array, he exclaimed: "By the army of St. James they have profited by our lessons! May God have mercy on our souls, for our bodies are theirs!" Nor was the prayer unnecessary—when the battle had drawn to a close, of Simon de Montfort nought remained but the lifeless clay.

Whatever opinion may be formed of the character of the Earl of Leicester—of his ambition and rapacity—it must still be acknowledged that his attempts at reform were productive of lasting benefits to the kingdom by laying the foundation of the liberties which we now enjoy. At this conclusion we arrive very rapidly: where parliaments are not held, the people are virtually slaves. Our representative system, being more beneficial than those of other countries, from the fact that it had the power of the purse, has done much for English liberties. It has watched over them;—it has sheltered them;—they have grown hardy and flourishing beneath its tender care. We imagine few will dispute this point, and it is equally clear that our representative system was fully developed under Simon de Montfort. The authority of Hallam decides this question. In his splendid work on the "Middle Ages," he says:—

"The principle of representation, in its widest sense, can hardly be unknown to any government not purely democratical. In almost every country the sense of the whole is understood to be spoken by a part, and the decisions of a part are binding upon the whole. Among our ancestors, the lord stood in the place of his vassals, and, still more unquestionably, the abbot in that of his monks. The system, indeed, of ecclesiastical councils, considered as organs of the Church, rested upon the principle of a virtual or an express representation, and had a tendency to render its application to national assemblies more familiar.

"The first instance of actual representation which occurs in our history is only four years after the conquest, when William, if we may rely on Hoveden, caused twelve persons skilled in the customs of England to be chosen from each county, who were sworn to inform him rightly of their laws; and these, so ascertained, were ratified by the consent of the great council. This Sir Matthew Hale asserts to be 'as sufficient and effectual a Parliament as ever was held in England.' But there is no appearance that these twelve deputies of each county were invested with any higher authority than that of declaring their ancient usages. No stress can be laid, at least, on this insulated and anomalous assembly, the existence of which is only learned from an historian of a century later.

"We find nothing that can arrest our attention in searching out the origin of county representation till we come to a writ in the fifteenth year of John, directed to all the sheriffs in the following terms: Rex Vicecomiti N., salutem. Præcipimus tibi quod omnes milites balliviæ tuæ qui summoniti fuerunt esse apud

Oxoniam ad Nos a die Omnium Sanctorum in quindecim dies venire facias cum armis suis: corpora vero Baronum sine armis singulariter, et *quatuor discretos milites* de comitatu tuo, illuc venire facias ad eandem terminum, ad loquendum nobiscum de negotiis regni nostri. For the explanation of this obscure writ, I must refer to what Prynne has said; but it remains problematical whether these four knights (the only clause which concerns our purpose) were to be elected by the county, or returned, in the nature of a jury, at the discretion of the sheriff. Since there is no sufficient proof whereon to decide, we can only say with hesitation that there *may* have been an instance of county representation in the fifteenth year of John.

"We may next advert to a practice, of which there is a clear proof in the reign of Henry III. Subsidies granted in Parliament were assessed, not as in former times, by the justices upon their circuits, but by knights freely chosen in the county-court. This appears by two writs, one of the fourth and one of the ninth year of Henry III. At a subsequent period, by a provision of the Oxford Parliament in 1258, every county elected four knights to inquire into grievances, and deliver their inquisition into Parliament.

"The next writ now extant, that wears the appearance of parliamentary representation, is in the thirty-eighth year of Henry III. This, after reciting that the earls, barons, and other great men (cæteri magnates), were to meet at London three weeks after Easter, with horses and arms, for the purpose of sailing into Gascony, requires the sheriff to compel all within his jurisdiction, who hold twenty pounds a-year of the king in chief, or of those in ward of the king, to appear at the same time and place; and that, besides those mentioned, he shall cause to come before the king's council at Westminster on the fifteenth day after Easter, two good and discreet knights of his county, whom the men of the county shall have chosen for this purpose, in the stead of all and each of them, to consider, along with the knights of other counties, what aid they will grant the king in such an emergency. In the principle of election, and in the object of the assembly which was to grant money, this certainly resembles a summons to parliament. There are, indeed, anomalies, sufficiently remarkable upon the face of the writ, which distinguish this meeting from a regular parliament. But when the scheme of obtaining money from the commons of shires through the consent of their representatives had once been entertained, it was easily applicable to more formal councils of the nation.

"A few years later there appears another writ analogous to a summons. During the contest between Henry III. and the confederate barons in 1261, they presumed to call a sort of Parliament, summoning three knights out of every county, secum tractaturos super communibus negotiis regni. This we learn only by an opposite writ issued by the king, directing the sheriff to enjoin these knights, who had been convened by the Earls of Leicester and Gloucester to their meeting at St. Alban's, that they should repair instead to the king at Windsor, and to no other place, nobiscum super præmissis colloquium habituros. It is not absolutely certain that these knights were elected by their respective counties. But even if they were so, this assembly has much less the appearance of a Parliament than that in the thirty-eighth of Henry III.

"At length, in the year 1265, the forty-ninth of Henry III., while he was a captive in the hands of Simon de Montfort, writs were issued in his name to all the sheriffs, directing them to return two knights for the body of their county, with two citizens or burgesses for every city and borough contained within it. This, therefore, is the epoch, at which the representation of the Commons becomes indisputably manifest, even should we reject altogether the more equivocal instances of it which have just been enumerated."

WORKS OF GREAT MASTERS.

ORNAMENTAL SCULPTURE BY JEAN LEPAUTRE.

WE present our readers with two specimens of ornamental sculpture, rich and noble in design, and highly finished in workmanship. They belong to a felicitous era of the arts, the middle and the latter half of the seventeenth century. In the beginning of the century following a style less pure was introduced. Minute and crowded decoration, and a meretricious and artificial prettiness, took the place of that bold, free, clear style, which for a long period had characterised the principal productions in this department of art.

Our illustrations represent with great fidelity two beautiful samples of the genius and skill of JEAN LEPAUTRE, the famous architect, designer, and engraver. While a marvellous power is shown in the details, each of which rivets the eye in succession, the beauty of general form and outline in the whole vase has been preserved with care. This is a point soon overlooked in the degeneracy of taste. But here the whole effect, which may be termed the substance and climax of that result at which the sculptor aims, is not sacrificed to minuteness of detail. He has not been bewildered by his own teeming fancies; they are distinct, harmonious, subordinated. They are clear without being sharp, and rich without being florid. The grouping is as dramatic and as explicit as it could have been made in a painting, and the figures have the advantage of bold alto *relievo*. We have not surface merely, but real shape, in exquisite proportion. There is, besides, the charm of profuse variety in each.

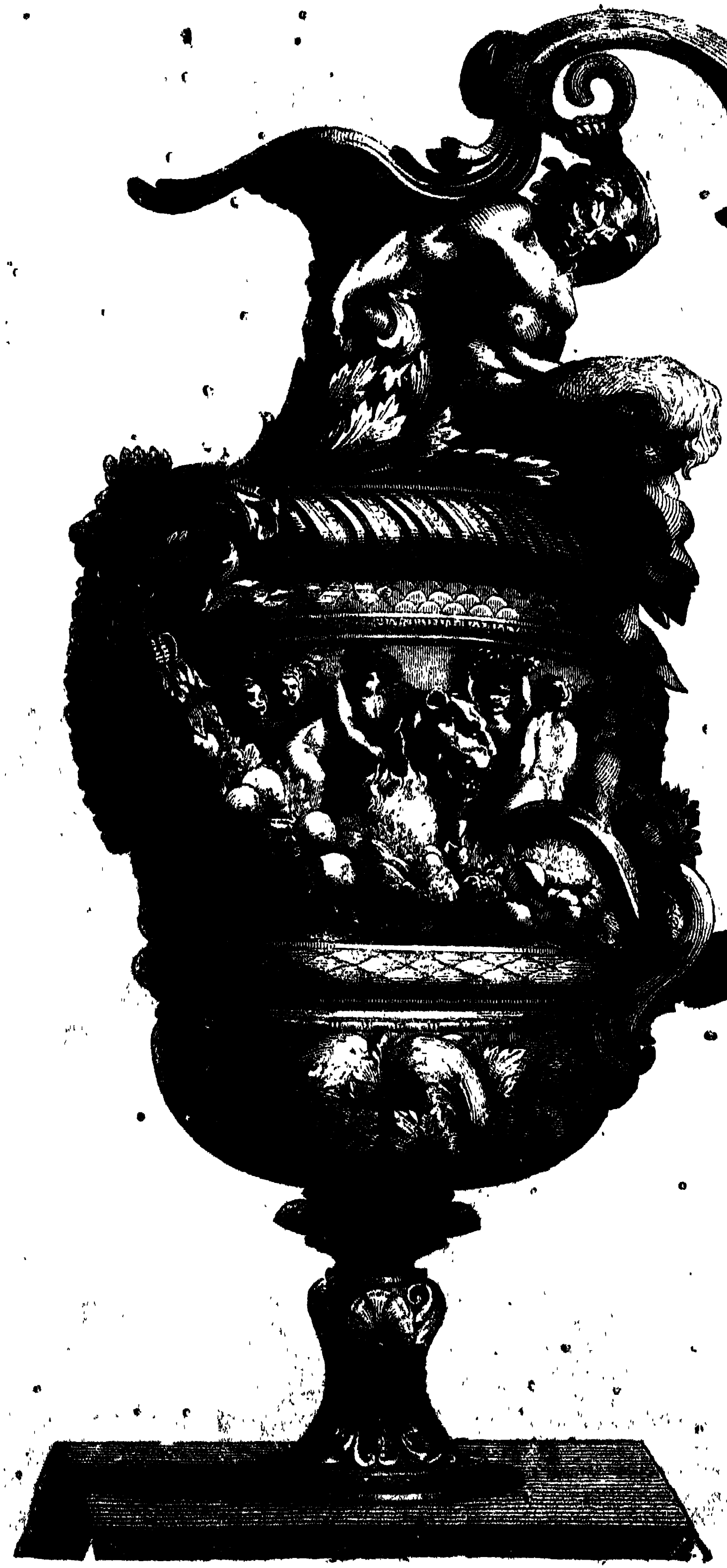
In the first vase the figures are busy in what we might almost term a little landscape. There is a grand, bold, rude, and shaggy mythological monster; there are fruits, flowers, and leaves; and all is delicately as well as deeply chased.

In the second illustration we have also a mythological subject: Neptune, with his trident in hand, is about to descend from his car, surrounded by his conch-blowing retinue, and to enter the coral halls where he reigns over the deep sea. The naiads are peeping from their weedy bowers. The rude immortal who has charge of the steeds of "*Poseida-on Einosichthon*" (the Homeric name of Neptune) is restraining them while the dread monarch descends; and the whole vision of the sculptor teems with life and energy. The legs of the horse, with his front paws plunged in the water, seem to move; and the water itself, which is an element distinguishing this vase from the other, flows, so to speak, in long and placid waves at the presence of its king. It is surprising how gold, or bronze, or silver should be made by the "cunning" chisel to convey these ideas, to exhibit such a scene and to tell such a story.

The reign of Louis XIV. was highly favourable to art. Whatever the faults of that splendid erring man, he certainly had an open hand and a smiling countenance for genius. Among the eminent artists to whom his encouragements opened the road of fame and prosperity was he of whose skill we are enabled to give our readers a specimen in the two fine engravings which we have been discussing.

JOHN, or JEAN LEPAUTRE, was born in 1617. In his youth he was bound apprentice to a joiner or house carpenter, who instructed him in the elements of drawing. He not only quickly mastered all that his teacher could impart to him, and became an able draughtsman, but also a finished engraver. Endued with this profitable combination of talents, he published a great number of architectural decorations, embracing a variety of subjects—chimney-pieces, vases, ceilings, interiors of rooms, &c. All these plans, or suggestions, discover a fertile and brilliant imagination. He never became, properly speaking, or in the more technical sense, an architect; but he deserves a separate mention on account of the extraordinary influence which he exercised upon the art of his time, and upon contemporary artists. In 1677 Lepautre was admitted into the Academy of Sculpture. It is a curious fact, and to be regretted, that the majority of his designs (his decorations for ceilings, &c.) were not adopted. They were, in almost greatly superior to the plans put in execution in the great buildings of that epoch. He died in 1682, greatly admired, though not perhaps duly appreciated. His designs are in great request, especially among workers in gold and silver.

ANTHONY, or ANTOINE LEPAUTRE, the brother of John Lepautre, was, properly speaking, an architect, and was employed as first architect by the King. The principal edifices built from his designs are the Church of Port Royal, the Hôtel de Gêvres,



DESIGN FOR A VASE, BY JEAN LEPAUTRE.—(*See page* 35.)

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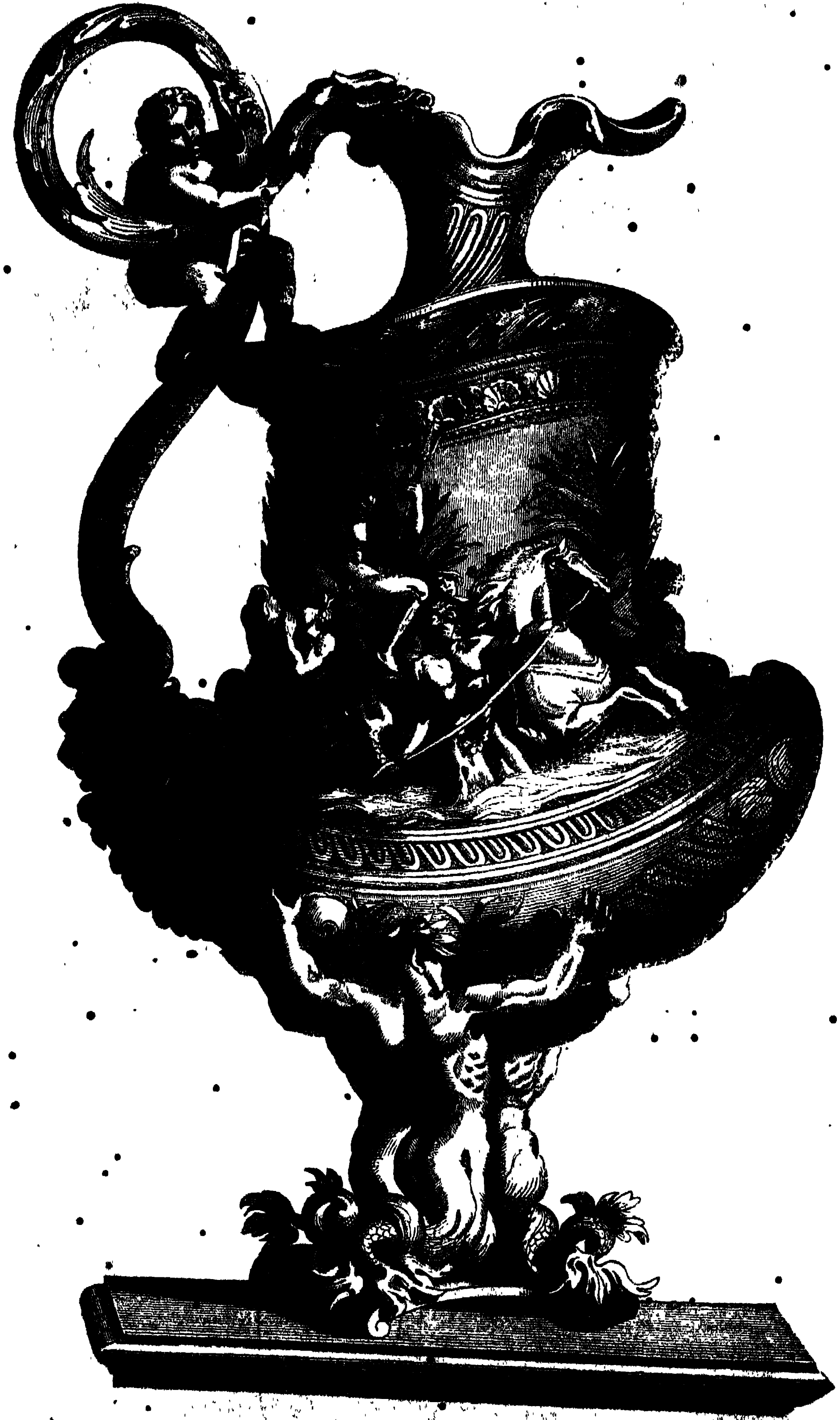
that of Chamillard, the house of the Duke de Gèvres at St. Ouen, and the Beauvais in the Rue St. Antoine at Paris He published a work on architecture, afterwards edited with notes by Daviler.



DESIGN FOR A VASE, BY JEAN LEPAUTRE.—(*See page* 35.)

Anthony Lepautre added two wings to the Chateau of St. Cloud, and drew the plan of the higher part of the great cascade. He executed several other remarkable works, and was admitted as an associate in the Academy of Sculpture in 1671, the year of its foundation, six years earlier than his brother John. He died in 1691, at the age of seventy-seven. His death was by some attributed to chagrin at Mansard's having been preferred before him as the architect of the Chateau of Clugny. A collection of his designs was published in 1751.

THE PORTRAIT GALLERY.

THE RIGHT HON. BARON TRURO,

LORD HIGH CHANCELLOR OF ENGLAND.

THOMAS WILDE, whose present style and title have recently been given, was the second of the four sons of an attorney in London. He was born in that city on July 7th, 1782, and educated at St. Paul's School. On terminating his course in that establishment, he went into the office of his father. Even as a boy he discovered much smartness in professional business, and the attendants of the Judges' Chambers did not fail to notice the unusual shrewdness and energy of one who still wore a frill about his neck.

Leaving his father's office, he aided in the conduct of the business of a legal firm in the City, extensively employed by the members of "Lloyd's." While thus engaged he is said to have generously assisted, from the proceeds of his own professional exertions, the course of his elder brother at Trinity College, Cambridge, who early obtained a judicial appointment and the honour of knighthood. Sir John Wilde is now Chief Justice of the Cape of Good Hope. A younger brother remained with his father, and is the head of one of the leading firms in the City of London, the nucleus of which was formed by his parent.

The signal ability Mr. Wilde displayed in the mercantile transactions of the members of "Lloyd's" was not merely noticed, but so highly approved, by the men of commerce with whom he was thus brought into contact, that they strongly urged him to start in his profession on his separate account, and even proffered, in addition to their legal business, all such support as he might consider desirable. Complying with their wishes, and accepting their aid, with a deep sense of the kindness and confidence of which he was the object, he entered on his practice as an attorney, which he conducted with the greatest success. In the business of the Bankruptcy Courts, and in that of Nisi Prius at Guildhall, his name appears at this period on the cause-lists, associated not only with the greatest number, but with all those of the highest importance.

Meanwhile, one of the recreative topics in the conversations of men of business in the City was "the pretty banker's widow," who was said to enjoy the very comfortable jointure of £2,000 a year; and though the step was deemed sufficiently ambitious, Mr. Wilde made proposals to the lady. It was whispered, however, that the lady would only accept them on one condition—that he would relinquish his business as an attorney, and go to the bar. But, apart from the sacrifice that would thus be incurred, there was an extraordinary, indeed some might suppose an insuperable, difficulty, for Mr. Wilde not only stammered, as many gentlemen do, when engaged in such verbal communications, but even in ordinary conversation. Nor did he fail, it may be supposed, to indicate the obstacle—delicately, doubtless, for who would be chargeable at such a crisis with exaggerating an infirmity? But of what avail could it have been even to incur such temerity? For had not the Athenian corrected his stammering by practising with pebbles in his mouth, and strengthened his voice by walking or running up hill, and pronouncing some passage in an oration or a poem during the difficulty of breathing which that caused; and then achieved, as Demosthenes, a world-wide and undying fame? Mrs. Desvagnes, therefore, could not, we may imagine, recede from her determination; but with that quick, clear, and correct perception characteristic of her sex, and so often superior to the judgments of ours, she is said to have replied, "You can do anything on which you are resolved." If so, Mr. Wilde felt that from that decision, though not judicial, there was no appeal: he certainly relinquished his highly-remunerative practice, withdrew his name from the roll of attorneys, according to the requirement of the Inns of Court, and ventured the honours and emoluments of his future life on his success at the bar. But on forensic engagements he could not enter at once, for he had before doing so to remain for five years a student of an Inn of Court. Still there was happiness to be enjoyed at once in his marriage—happiness, too, of no ordinary kind, and continued without interruption during a long course of years. He fulfilled, also, the prediction which is rumoured to have been so affectionately and sagaciously uttered, in removing entirely by his own efforts the impediment from which he had suffered, and became an orator of distinguished fluency, power, and impressiveness.

In 1817, Mr. Wilde was called to the bar by the Honourable Society of the Inner Temple, and went the Western Circuit. To the credit of that branch of the profession he had left, no jealousies of his new position were allowed to operate; at once his clients were numerous in the Courts of Westminster and Guildhall, and on circuit he was equally successful.

There is ample evidence of the distinction he had gained during three years in the fact, that Alderman Wood, the confidential advisor of Queen Caroline, insisted that Mr. Wilde should be retained when legal proceedings were taken against that lady in 1820. He became, therefore, junior counsel on the Queen's trial, having as his leaders Messrs. Brougham, Denman, Tindal, Williams, and Dr. Lushington, who, as is well known, conducted it to a most successful issue, amidst the exultation of the people at large, whose idols the law officers of her Majesty became.

That the Queen was absolutely innocent was the belief of the multitude; while, on the suspicion of any wrong, as Mr. Ward, afterwards Lord Dudley and Ward, remarked, "the dignity of law outstrips its just functions when it interferes to punish misconduct that has been provoked by outrage and facilitated by neglect." The result, therefore, affected not only the royal person who had awakened and sustained an unparalleled sympathy, but the civil security of the people of England. Accordingly, on the abandonment of the Bill of Pains and Penalties, Lord Erskine said—"My life, whether it has been for good or for evil, has been passed under the sacred rule of the law. In this motion I feel my strength renovated by that rule being restored. The accursed change wherewithal we had been menaced has passed over our heads. There is an end of that horrid and portentous excrescence of a new law, retrospective, iniquitous, and oppressive; and the constitution and scheme of our polity is once more safe. My heart is too full of the escape we have just had, to let me do more than praise the blessings of the system we have regained." To so momentous a result, the intelligence, acuteness, and indomitable energy of Mr. Wilde greatly contributed, in the preparation of her Majesty's case out of court—services, indeed, of inestimable value, though not, like others, filling the public ear and public eye. That they were rightly appreciated by the Queen, who regarded him with the highest confidence, was manifest in Mr. Wilde's appointment as co-executor with Dr. Lushington; in which capacity, together with Lord and Lady Hood and Lady Ann Hamilton, they attended her remains to Brunswick, where they were deposited in the family vault, with those of fifty-seven of her illustrious relations.

In 1827 the successful progress of Mr. Wilde at the bar was next indicated by his being called to the degree of the Coif, thus affording him, as a leader, a full opportunity for the display of his great forensic talents, and immensely increasing the professional business he was then conducting. Three years after this, Lord Chancellor Lyndhurst, allowing his sense of distinguished ability to outweigh all merely political preferences, conferred on him the additional honour of a King's Serjeant, thus giving him, not only rank and precedence in the Court of Common Pleas, but also over all King's Counsel in the other courts.

This act was peculiarly graceful in Lord Lyndhurst, as Mr. Wilde had always been associated with the opposite party in politics. "I was a Reformer," he said recently, in the House of Lords, "before being so had become fashionable." Soon after he was made serjeant, his independent character was manifested in his repeated contests with the Lord Chief Justice Best; determinately resisting the unfair attempts of the bench to interfere with the proper functions of the bar. It was believed in the profession that the retirement of the Chief Justice of the Common Pleas was accelerated from his being, on all such occasions, *second Best*.

Mr. Wilde's advocacy of true liberty—for religious freedom is essential to that which is civil—became especially apparent during the efforts that were made to obtain Catholic Emancipation. One of its zealous antagonists was the Duke of Newcastle, who, among diverse elements of power, leased various Crown lands, and possessed others, at Newark, in which town, despite of the declaration that "it is an infringement of the liberties and privileges of the House of Commons for any lord of parliament, or lord-lieutenant of any county, to concern himself in the election of members of parliament," the Duke's political authority was almost supreme. No sooner, therefore, did he find that his nominee, General Clinton, was favourable to Catholic Emancipation, than he was summarily dismissed from his parliamentary seat; while the Duke's tenantry heard in the same hour that a new writ had been issued, and that Mr. Michael Thomas Sadler was in the field, *really* enjoying the suffrages of the Duke, but *nominally* asking that he might have theirs. The anticipations of success, warranted not only by past experience, but by the subtle precautions that had been so promptly taken, were doomed, however, to a sudden and unlooked-for disturbance, by the announcement in Newark of Mr. Sergeant Wilde's immediate appearance. Most gallantly did he attack the baron, who, and not Mr. Sadler, was the actual antagonist—ensconsed, albeit, within the ducal walls of Clumber—amidst the throbbings of multitudes of hearts eager for his triumph, and to which there was a large accession, from his manly bearing and generous spirit, in the town of Newark itself; but only to couch his lance, and to witness the return of another nominee to St. Stephen's, where he speedily delivered himself of his pent-up Philippic—the accumulated eloquence of years—against that liberty which an overwhelming majority of England's representatives was about to bestow. But neither the return nor the oratory of Mr. Sadler soothed the troubled spirit of the Duke. Some of his tenants had dared to vote for Mr. Sergeant Wilde, and as he never granted them a lease, for that might endanger his political power, he sent them *instanter* notices to quit their various holdings, even to a gentleman who had a small piece of land for which he paid the annual rental of a sovereign. A public meeting was speedily called in consequence; Mr. Sergeant Wilde attended, but not Mr. Sadler; his presence was, of course, unnecessary, when the Duke had graciously determined to address to those assembled a letter, concluding in terms which speedily became a proverb: "Is it to be presumed that I am not to do what I will with my own?"

The Duke did not see that though *he* might class his tenantry with his "goods and chattels," yet a serf might rise to all the dignity of humanity, and that a sense of oppression quickens into life, activity, and the highest manly vigour, the faculties which have long been depressed as by an iron hand; for though a second attempt on the part of the popular candidate failed, like the first, another year (1831) brought to the Duke fresh revelations, in the return of Mr. Sergeant Wilde for his "*own*" borough at Newark, by a majority of one hundred and seventy-three over his "*own*" candidate, to enter the very Parliament that carried the Reform Bill.

On the first general election after that event, Mr. Serjeant Wilde lost his seat for Newark by a few votes; but in 1835 he was again returned for that borough. During his second career in Parliament, he, with extraordinary ability, defended its privileges, which he regarded as really those of the people, in the great case of Stockdale *versus* Hansard; he delivered on it one of the most eloquent and impressive speeches ever heard within the walls of the House of Commons; he became, in fact, the Mentor of both its political parties, and now gave ample evidence of that marvellous power of adjusting difficult questions, as well as those which are legal, which clearly marked him out as the future law-officer of the Government that should share his political views.

The acme of his professional career was attained in the celebrated cause of Small *versus* Atwood. The British Iron Company had purchased immense works in Staffordshire, when a great revulsion occurring in the iron trade, they, under a painful sense of loss, instituted a suit in equity to set aside the purchase, on the ground of the vendor's misrepresentations as to the real state of the property. So important was this cause deemed, that Sir Edward Sugden received a fee of five thousand guineas as counsel for Mr. Atwood; and when it was ripe for decision, Lord Lyndhurst withdrew from town for the express purpose of preparing a most elaborate judgment, which, in due time, was pronounced, amidst great admiration for the high qualities it displayed, against Mr. Atwood, and in favour of the British Iron Company. From this "crack decision," as it was popularly termed, there was, however, an appeal to the House of Lords, to conduct which Mr. Serjeant Wilde was retained with a fee of seven thousand guineas.

That even this unprecedented retainer was well, not to say hardly earned, is evident from his speech at the bar of the House of Lords occupying fourteen days; from such intensity of application being required that he did not leave his chambers in the Temple for nine or ten successive nights; from the ultimate reversal of Lord Lyndhurst's judgment; and from the consequent security of the Serjeant's client to the amount of from six to seven hundred thousand pounds. During the progress of this suit, Mr. Serjeant Wilde retired from the Western Circuit. He afterwards became extensively engaged on special retainers, which the etiquette of the bar forbids being less than three hundred guineas, in the various circuits of England; and that he was thus retained to the extent of six, during one period of holding the assizes, it is believed the cause-lists of the circuits would prove.

In November, 1839, Lord Melbourne, fully aware of his perfect adaptation to become a law officer of the Crown, with honour to himself and advantage to the country, appointed him Solicitor-General. As the acceptance of this office vacated his seat, he had again to repair to Newark; and as the writ could not be obtained till the sitting of Parliament in February, the most strenuous efforts were made in the interval to prevent his return, by his opponents, at the utmost stretch of their territorial influence. But their struggle was vain. The Solicitor-General of Queen Victoria was returned once more, but only by a majority of nine, and received the honour of knighthood on the 19th of February, 1840. On the 13th of June, however, in the following year, he had to suffer a great domestic calamity, in the death of Lady Wilde, for whom he had always cherished the tenderest affection. Four children were the issue of this marriage, of whom one died early; the two sons were called to the bar in 1842.

During the time in which Sir Thomas was the Solicitor-General, great difficulties were experienced by the Government in connection with the affairs of Canada, while others arose from the imprisonment of the Sheriffs of London, for their breach of the privileges of Parliament; and in both cases his services were not only such as most amply to justify his being called to office, but to indicate his preparation for functions of still higher responsibility.

It was about this period, also, that Sir Thomas displayed his usual energy and perseverance, by the part he took in the important debate in Parliament relating to the alleged tampering with the jury-lists, from which the special jury had been taken in the case of Mr. O'Connell. On this occasion he delivered one of his most successful speeches in Parliament; it occupied three columns of the *Morning Chronicle*, and a second edition of the speech was published in that paper on the following day. Sir Thomas was afterwards the leading counsel in the appeal of Mr. O'Connell to the House of Lords, resulting in the reversal of the judgment of the Court of Queen's Bench, in Ireland, and the consequent liberation of that gentleman from imprisonment. For Sir Thomas's invaluable services on that occasion, it was stated amongst Mr. O'Connell's friends, that he declined the acceptance of any fee. On October 30th of the same year he was sworn a member of the Privy Council.

On the dissolution of Parliament in 1841, Sir John Campbell was appointed Lord Chancellor of Ireland, and Sir Thomas Wilde became his successor as Attorney-General. He now sought his re-election to the House of Commons at the hands of the citizens of Worcester, and was triumphantly placed at the head of the poll. On the change of the Government by the coming in of Sir R. Peel, Sir Thomas, of course, ceased to be Attorney-General.

The journals of the House of Lords record an application of the late Sir Augustus D'Este to be called to the House by the title of Duke of Sussex, as held by his late royal father; the great point of which was, however, the establishment of his legitimacy and that of his sister, according to the law of England. Sir Thomas Wilde was selected to conduct the application in the House of Peers. Great as must have been the anxiety of Sir Augustus D'Este in its issue, the anxiety of his sister must have been still more intense; and, though the claim to the dukedom was not established, that lady gained what may be supposed to have been the dearest wish of her heart, in the entire vindication of her mother's character, and the demonstration that Lady Augustus Murray was the lawful wife of his Royal Highness the Duke of Sussex. The only bar to the claim of the dukedom was the Royal Marriage Act, requiring in such cases the assent of the Crown, which had not been given. It cannot, therefore, excite surprise that on Sir Thomas Wilde becoming a suppliant for the hand of Lady Augusta Emma D'Este, her accomplished and eloquent advocate should be successful in his suit. The marriage was celebrated August 13th, 1845.

DRAWN BY THOMAS. H. LINTON, SC.

THE RIGHT HON. BARON TRURO, LORD HIGH CHANCELLOR OF ENGLAND.

The change of policy on the part of Sir R. Peel in reference to the Corn Laws, and the consequent disruption of his Government, led, as is well known, to the return of Lord John Russell to power, who at once offered the Attorney-Generalship to Sir Thomas Wilde. This office required that he should again visit Worcester. The new writ was issued on a Friday evening, and on Sir Thomas reaching that city, he found that there was no opposition, but that his immediate return was secured by the most cordial concurrence of all parties. On the following Monday, however, he received from Lord John Russell an intimation that he was appointed, on the somewhat sudden death of Sir N. Tindal, Lord Chief Justice of the Court of Common Pleas. His return to town was therefore obligatory; but such was the confidence of the citizens of Worcester in their late member, that they *improvised* a candidate in the person of Sir Denis le Marchant, who, within twelve hours of his being known to them, even by name, was returned as the successor of Sir Thomas.

In the discharge of the functions of the Chief-Justiceship he continued, with important results to his fame, till the year 1850, when, in the month of July, after the Great Seal had been in commission for a few weeks, he became Lord High Chancellor of England, and took the title of Baron Truro. The doubts that arose in some quarters as to his adaptation to this high office could only be entertained in ignorance or forgetfulness of his past career. Independently of his vast practice from the very time in which he first entered on the legal profession, to the close of his career at the bar, giving him the most intimate familiarity with all kinds of business, it may be questioned whether, during the last ten years of his forensic course, he were not as fully engaged in matters of equity as in those of common law. That Baron Truro is a most able and pains-taking Lord Chancellor is the concurrent and cordial testimony of the Chancery bar, to which there is no doubt that his future judicial labours will give additional emphasis.

THE CASSOWARY, OR EMU. *(See Page 42.)*

It has been justly remarked by Sydney Smith, that "the order of human excellence is often inverted, and that great talents are considered as an excuse for the absence of obscure virtues." It is, therefore, truly gratifying to add that no such excuse has to be pleaded for Baron Trurg. He is surpassed by no man in the esteem, veneration, and affection with which he has been, and still is, regarded throughout his far-extended social circle; and the sketch of his career now given, though necessarily compressed within narrow *limits, is a sufficient demonstration of the elevation* which may be obtained, amidst the free institutions of our country, by men of talent employing their energies with unwearied perseverance, and especially sustaining their exercise by high moral worth.

NATURAL HISTORY.

THE CASSOWARY, OR EMU.

The bird in our engraving is the Cassowary of New Holland, or, as it is commonly called, to distinguish it from the cassowary of India, the *emu*. Although it very much resembles the former in external apppearance, it differs widely from it in many important physiological characteristics. Its head is not surmounted by the horny top-knot which is found in the other, neither has it the two-lobed appendage hanging from its neck. Its beak is compressed or flattened downwards, and its size is much larger. It is not, like the Indian cassowary, ever found in any part of the Indian Archipelago, or, in fact, anywhere but in Australia, and particularly in the neighbourhood of Port Jackson and Botany Bay.

Its general form closely resembles that of the American ostrich: the toes are three in number, the head is lightly covered with crisped feathers, and the neck is in some places bare, showing the skin somewhat carunculated; the bill is black, and the edges in some parts serrated; the wings are extremely short, and have no pinions; the plumage is of a brown, greyish colour, and is composed, pretty uniformly over the whole body, of a sort of long thin feathers, furnished with short hair down to the extremity. The young ones are covered with streaked down of a dirty white colour.

Very little is known of the habits of the bird. It lives upon young berries and tender herbs; and it is said, by those resident in the neighbourhoods which it frequents, to be very wild, and to run with as much swiftness as a hare. It is sometimes hunted for the sake of its flesh, which is said to taste like beef. At the present day it is becoming very scarce, and removing farther into the interior, so that it is now rarely seen in localities in which it was once very abundant.

A specimen of the Indian cassowary was placed, some years ago, in the Surrey Zoological Gardens. This variety also is now very scarce even in India, and very few have ever been domesticated. The habitual dulness of these birds, their disagreeable voice, and their hard, black flesh, offer no compensation for the cost of rearing and supporting them. The wild cassowary feeds on fruits, tender roots, and occasionally on the young of small animals. The tame are fed not only on fruits, but on bread, of which they consume about four pounds a-day. They run very swiftly, and often outstrip the fleetest horses. They resist dogs by dealing them severe blows with their feet. The male bird generally leaves his mate to the cares of incubation, which are required only at night, for during the day their three greyish eggs, spotted with green, are exposed to the vivifying effects of the sun, being slightly covered with sand in the hole where they have been laid. In captivity, their incubation lasts eight-and-twenty days. The first cassowary ever seen in Europe was brought by the Dutch in 1597.

The head of the Indian cassowary is almost bare, covered with a bluish skin, out of which grow a few scattered hairs. It is crowned with a conical helmet, brown in front and yellow in other parts; this helmet is formed by the swelling of the skull-bones. The whole length, from the beak to the rump, of the full-grown bird, is rather more than five feet.

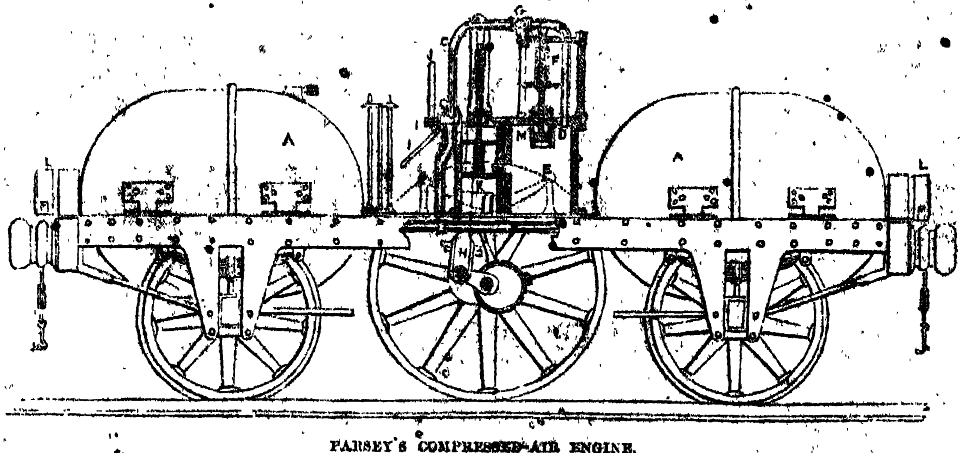
SCIENTIFIC INVENTIONS AND IMPROVEMENTS.

PARSEY'S COMPRESSED-AIR ENGINE.

On the attainment of the gigantic power of steam, and its application to locomotion, to a constantly-enlarging extent, it was natural to inquire if there were not some other agent whose energies might be similarly tasked, and that with certain advantages which have not been at present attained by steam locomotives.

One result arose out of an acquaintance with the *compressibility* of the air. The pneumatic condenser, for example, is a syringe, constructed on the same principle as the air-pump, except that the valves are disposed in the contrary order, that is, to open *inward* instead of *outward;* and by this instrument a large quantity of air may be forced into a given space. A pleasing illustration of its use may sometimes be seen. A globe of japanned ware is mounted on a pedestal, and, from a jet at the upper part a fountain may be observed to play for a considerable time. The fact is, that water having been put into the globe, and a considerable quantity of air added, by means of a condensing syringe, the force of the air is exerted on the water, which makes its escape from violent pressure through the jet; thus the fountain is formed, and will continue to play till all the water in the globe is driven out.

A familiar instance of much greater power, yet having precisely the same origin and character, appears in the air-gun A strong vessel of metal is constructed, into which air is forced



PARSEY'S COMPRESSED-AIR ENGINE.

y means of a condensing syringe, through a small hole, with a alve opening inwards. The vessel, being then detached from the yringe, is screwed to the breech of a gun-barrel, and a trigger, dapted to the stock of the gun in the usual way, is constructed so as to be capable of opening the valve. The bullet, which should fit the barrel very exactly, so as to leave no windage, is placed near the breech. On pulling the trigger, the condensed air escapes through the valve, and rushes with violence into the barrel, propelling the bullet before it. The same supply of air in the vessel will serve for several successive discharges, but the projectile force becomes weaker after each one.

This fact has given rise to various calculations. Thus, it is estimated that the elastic force of ignited gunpowder is from 1000 to 2000 times greater than common air; it would therefore seem that air would require to be condensed upwards of a thousand times beyond its natural state, in order to exert the same propulsive force as gunpowder. But the velocities communicated are as the square roots of the forces; and consequently, if the air in the vessel be condensed only ten times, it will exert a force only equal to 1-100th of that of inflamed gunpowder, and communicate a velocity of 1-10th. One circumstance, however, adds considerably to the effect of the air-gun—for as the vessel is large in proportion to the cavity of the barrel, and the valve continues open a sensible portion of time, the ball is impelled *all the way* through the barrel with nearly the same force as at the first instant, and thus gains a decided superiority, so that air condensed only ten times in a vessel of considerable size projects a ball with a velocity not greatly inferior to that of gunpowder.

The force thus exerted led Mr. Parsey to the invention of his Compressed-Air Engine, the construction of which we shall endeavour to explain as briefly as possible. The engraving exhibits a side elevation of the carriage, with a section of the working parts of the engine. A A are the receivers of compressed air; B is the tube connecting the receivers from which the air passes up the supply-pipe, C, into the equalising cylinder, E, at D. At the top of the equalising cylinder, E, is a self-acting apparatus for adjusting the supply of air to the working cylinders, K K; this is done by setting the spring, F, so as to press down the valve, M, with a force equal to that at which the engine is to be worked—for example, 60 lbs. per inch. Whenever, therefore, the pressure in E becomes greater than that, the valve, M, is forced up, and partially closes the valve, G, thereby limiting the supply from the receivers, A A, and preserving a uniform pressure in E. The condensed air is conducted into the working cylinders, K K, through the sliding valves, in the same manner as steam, and is admitted or shut off by raising or depressing the handle of the stop-cock, J. Motion is communicated from the cross-head direct to the crank-axle of the driving-wheels by the connecting-rods, H H. L L, are for connecting the hose or pipe of the stationary reservoirs with the receivers, when a fresh supply of condensed air is required.

As, like steam, the power of compressed air can only be limited by the strength of the vessel in which it is confined, it is assumed to be equal to any labour required for locomotion. Mr. Parsey proposes to construct the receivers of his air-engine so as to sustain a pressure of from one to two thousand pounds per square inch, while the working pressure supplied to the engine from the equalising cylinder will be sixty pounds per inch; but even this may be increased, and the speed thereby varied from twenty to a rate equal to one hundred miles per hour. One charge will suffice to drive an engine, with a train of forty tons, fifty miles.

Supposing a sufficient power to be thus gained, a considerable saving would also be effected. A steam locomotive costs from £1,200 to £1,600, while an air-engine of equal power can be provided at from £700 to £1000. Nor is this the only economical item, for there is one in actual working, as well as in original cost. A much larger stock of steam locomotives is required than would be necessary of air-engines; the constant action of fire renders also the repairs of the former more frequent and costly than that of the others.

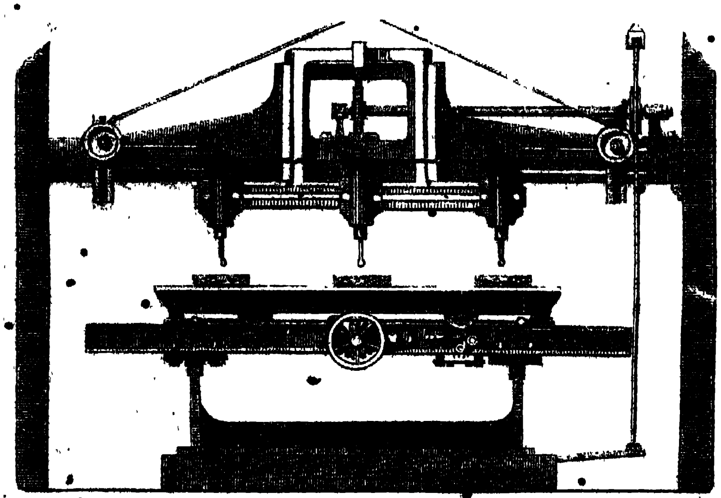
JORDAN'S PATENT MACHINERY FOR WOOD CARVING.

Wood Carving! at the mention of the words our mind is filled with images of sculptured walls and fretted roofs, recumbent knights and cherub faces with outspread wings; scroll and flower work on noble pillars, high above our head and lost in the dim distance; cunning handicraft in screen and choir, and stall and altar, and grinning grotesque heads on arch and capital. And amid these pictures of the fancy, even in the very centre of the gorgeous cathedral nave, rises the figure of Robinson Crusoe cutting another day-notch on the post beside his solitary home in the unknown isle—perhaps the very simplest form of wood carving ever recorded.

To trace the history of the art we should have to travel backwards to the very infancy of time—to gather from the traces found in tombs and among the buried cities of Pompeii and Herculaneum our little knowledge—to gaze with reverence on the many evidences remaining, in cathedral pageantry and ruined monastery, of the skill of they who decorated with loving hands those noble piles—to stand amid the remains recovered from desolated hall and storied mansion—to record the time when the wood-carver's art was made the vehicle of jest, and gibe, and ill-concealed rebuke in bas-relief and sculptured choir—to search out the memories of Grinlin Gibbon, and Bird, and Bailey, as they exist in scattered places little known—to speak of the efforts of self-taught artists among the bleak mountains and the sunny valleys of Switzerland—and to recal the memory of the numerous exquisite carvings exhibited in the Crystal Palace. With all the inclination to enlarge on these interesting topics, our space will allow us only to hint at a few of the sources from which the data of the wood carver's art may be derived; and so, ignoring for the present the existence of the many beautiful specimens shown in the Exhibition, by both Englishmen and foreigners, we will proceed at once to our subject—

WOOD CARVING BY MACHINERY;

and for this purpose we invite the reader to accompany us to the Belvidere-road, Lambeth, where are situated the works of the Messrs. Jordan.



JORDAN'S PATENT MACHINE FOR CARVING WOOD.—(*See next page.*)

Crossing Hungerford Suspension-bridge, we come into a neighbourhood but little known to the London pedestrian, where every building on the river side of the street is a manufactory, or a wharf, or a shot-tower, or a brewery. Entering a pair of large gates in the centre of a dull stone frontage, we find ourselves speedily in the workshop where was produced the exquisite specimen of carving from which our engraving is taken. This Belvidere-road is the original Pedlar's-acre, so called after the unknown personage who gave the land to the parish on condition that his portrait should remain for ever in the parish church—a request most religiously complied with; and in the south-east window of St. Mary's Church, the mother church of the manor, is to be seen to this day a full-length portrait of the original donor, with his pedlar's pack, staff, and dog. No other record of him is in existence.

We must not forget, however, that we are no longer in the street. Around us are sufficient evidences of labour to drive all antiquarian lore clean out of our brain—whirring wheels, driving-bands from the distant steam-engine, a hundred men at work, and that peculiar odour which pervades all places where timber is being cut up. It is a busy scene, indeed; but for our purpose it will be sufficient to describe the operations of a single workman. It must be premised, however, that the art of carving by machinery is by no means intended to supersede the more valuable and finished works executed by hand. All that the machine invented by Mr. Jordan can do is, not to produce originals, but to copy and multiply designs. And in this it is so successful, that it requires a practised eye to detect the original from the copy. By the aid of a diagram, we will endeavour to explain the *modus operandi*. It will be observed that the machine is an ingenious modification of the turner's lathe, with fixed cutters. On the "bed-plate" and "floating table" is fixed the block of wood to be operated on. The motion of this part is horizontal; and beside it lies the pattern which is to be transferred to the yet rude block. The upper part carries the tracing and cutting tools, the motions of which are both vertical and horizontal. If the vertical part be placed in contact with the horizontal—that is, if the tools be made to act on the block, while the latter is moved about horizontally in all directions, a figure will be described on the latter corresponding to the direction of its motion; as if, in drawing with a lead pencil, the pencil were fixed and the paper moved about against it. Such, in simple language, is the principle of Jordan's machine for carving on wood.

TROPHY OF GAME, &C., CARVED IN OAK BY JORDAN'S PATENT MACHINERY.

But to descend to particulars. The horizontal part of the machine consists of three castings—the bed-plate, which is a railway permanently fixed to the floor, and made perfectly horizontal; a carriage or frame running on this railway by means of four wheels, two only of which are seen in the engraving; and the horizontal table which carries the work, and is called the floating table. This last is furnished with four wheels running on the frame, but its motion is at right angles with the motion of the frame. The workman is thus enabled to move the floating table either laterally on its own wheels, or forwards and backwards by the frame, and thus bring any point in the floating table to any point in the same place with it. He moves the floating table from right to left with his left hand by means of the large wheel, and the table and frame are moved backwards and forwards with his right hand on a horizontal wheel in front, not here shown. The cutting-tools, which revolve freely on their axes, are supported by a bridge moving up and down by means of a bar. These tools are made to revolve from 5,000 to 7,000 times a minute, by means of an endless band driven by steam—seen, without the drum above, in the diagram. The model is fixed on the floating table under the tracer—in the centre of the diagram—and the block of wood, or other material to be carved, is placed under the cutter. Now it must be understood that the tracer, as it passes over every part of the model, guides or regulates the cutters in such a way as to produce a counterpart on the block of wood. By means of a pedal and counterbalancing weight, the workman moves the floating table about so as to bring every part of the pattern underneath the tracer; and, as the slide can only move vertically, whenever the tracer comes to a depression in the pattern it goes down, and the cutters make a similar depression in the block. In fact, the motions of the tracer and the cutter are identical. Thus, if there be an elevation in the model, it lifts up the tracer, and with it the cutters, which leaves an elevation of the same height in the blocks. And in this way the work proceeds — the tracer gliding silently over the pattern, and the tools cutting away the wood with a whirring noise on the blocks, till the work desired is accurately copied. The more minute the pattern to be imitated, the more delicate the tools employed; but it is nearly always necessary to finish the object by hand, as the finer parts are necessarily in a somewhat incomplete state. Where much undercutting is required, various modifications of the machine are employed. These consist either in turning the work round, so as to get at all the parts in succession, in using crooked tools and tracers, or in fixing the wood to be carved between two centres, or chucks, on the floating table, and moving it about carefully, the better to enable the workman to overcome the difficulties of the pattern. In this way the most intricate carving is accomplished; and, as a proof of the exquisite work which may be produced by these machines, it is only necessary to refer to the carvings in the House of Lords, which were all executed in the room in which we are now standing.

Previously to Mr. Jordan's invention—for which he received the gold medal of the Society of Arts, in 1847, "for inventing, arranging, and bringing into successful operation, such machinery as was capable of producing, or assisting in the production of, every kind of carving, so as accurately to copy any solid form which the mind and hand of the artist can conceive and execute"—there were in existence other, but less applicable, machines for carving in wood; but their want of exactness and economy in use prevented their ever being brought into successful operation. The only analogous invention is that of Mr. Cheverton, for producing in miniature copies of full-sized portrait models. Its precise operation is unknown, but its products are admirable. Of the utility of Messrs. Jordan's machine for carving there can be no question; and even on the score of its supposed injury to original works, no really tangible arguments can be produced. It copies, not invents, and its products may therefore be considered, with regard to the originals from which its designs are taken, to stand in the same light as the engraving does to the painting. It brings within the reach of the many copies of those famous works of art—for carving in wood may be said to stand next to sculpture in its relation to the fine arts—which, from their scarcity and high commercial value, none but few can ever hope to possess.

FORTRESS OF HAM, DEPARTMENT OF SOMME, FRANCE,

THE SCENE OF THE IMPRISONMENT OF LOUIS NAPOLEON, CHANGARNIER, LAMORICIERE, AND OTHERS.

We usher in no startling novelty—we propound no dazzling paradox—when we state that strange indeed are the vicissitudes of human life. The wheel turns round, and the beggar of to-day becomes the Crœsus of to-morrow. History is but a tale of revolutions. We see a king, the heir of a hundred kings, seated on an imperial throne; around him all is still and calm; flatterers speak with honied phrase. Suddenly the scene changes, and he is immured in a dungeon, or lays down his head upon the scaffold, or dies an exile in a foreign land. Sometimes the case is altered—the prisoner changes place with his gaoler; from the dungeon steps forth the occupant of the vacant throne. We have recently seen an illustration of this old truth in France. Louis Napoleon, but yesterday the prisoner of Ham, now sways the sceptre kingly hands tried in vain to grasp. In the halls where the Bourbons stood in their power and pride he alone is lord—but we need not dwell on so strange a spectacle; our readers for themselves can "point the moral and adorn the tale." We aim simply to describe the fortress from whence Louis Napoleon has worked his way to "a more than kingly crown."

The country traditions of the department of the Somme, in which the fort stands, attribute its erection to Louis de Luxembourg, towards the latter part of the fifteenth century. The year 1470 is generally supposed to be the date of the completion of the fort. On its walls one would look in vain, however, for the arms of Luxembourg, its reputed founder, or, at least, restorer. One would find, in lieu of them, the initial letter of the Christian name of Jeanne de Bar, only daughter of Count Robert de Bar; and this letter is in every instance placed between two girdles, a token that the device related to an unmarried lady. This lady, the heiress of the counties of Soissons and Marie, and of the lands of Ham, married Louis de Luxembourg on the 16th of July, 1435, and brought him the splendid dowry we have mentioned.

These circumstances not only prove that Louis was really not the builder, or even the restorer, of Ham, but would seem to show that the fort was already ancient in his time.

The oldest portion of the interior is evidently the building appropriated as the residence of the commandant or governor of the place. This part was built by order of the Duke of Orleans, brother of King Charles VI.; and there are letters patent, or royal, dated May 22, 1404, which *confirm* to that prince the possession of the lands which he had purchased of Mary de Bar, and permitted him to hold by right of peerage the counties of Soissons, Ham on Vermandois, &c. The Castle, situated in the midst of a quagmire or morass, is composed of four round towers, built at the angles of an oblong quadrangle. These towers are connected by very lofty walls, armed with loop-holes and other provisions of defence, which rendered the place a formidable fastness in the fifteenth century.

Two other towers of square form were interposed amid the round towers, and commanded the two entrances at opposite sides. One of these entrances is now walled up, and the bridge which led to it has been destroyed. The principal tower, with an Eastern aspect, is imposing from its massive and ponderous bulk. It is about a hundred feet high, and as many across in diameter. Its walls, built of soft stones, lined exteriorly with paving stones, are nearly forty feet thick. There are three storeys in this tower, and each storey consists of a large hexagonal room.

In the lowest storey are seen, in the thickness of the wall itself, twelve very narrow and very long cells. These were dungeons destined for the safe immurement of prisoners; and the word immurement is indeed singularly appropriate, since the captives were here not only surrounded by walls, but lodged in the very heart of a wall.

On the entrance-gate, the Constable, Louis de Luxembourg, had had engraved the motto "*Mon mieux*" (my best); meaning, perhaps, that in a fall of fortune this place would furnish him with the best alternative for which he could venture to hope. The gutter-spouts of this tower are extremely singular, being sculptured into all sorts of wild fantasies.

After the death of Luxembourg, his widow carried this property into the family of Vendôme, by her second marriage with Francis de Bourbon in 1487. Her son, of the same name, was born there in 1491. It was he who was afterwards taken prisoner, along with Francis the First, at the Battle of Pavia. Subsequently the same nobleman became one of the principal companions of Antoinette de Bourbon, grandmother of the celebrated Duke de Guise, who reconquered Calais from our own forefathers, after it had been an English dependency for a hundred years.

Towards the end of the fifteenth century the English made an unsuccessful attempt to storm and reduce Ham; but it was conquered by the Spaniards sixty years later, in 1557. Some Scottish adventurers formed part of the garrison on that occasion. Philip the Second of Spain opened a breach in the tower and curtain, which our illustration represents. In three days that King, who besieged the place in person, had thrown more than two thousand cannon-balls against the eastern tower. Two years afterwards Ham was restored to France by treaty.

After having passed successively through the possession of the families of De Coucy, De Bar, Luxembourg, Vendôme, and Navarre, Ham at length became crown property under Henry the Fourth. For more than a hundred years it has served as a state prison. Among its captives have been the Count de Marbœuf, Lautrec, and Mirabeau; the Republicans, Bourdon, Charles, Duhene, Choudieu, Victor Hugues; the Royalists, Vibray, Montmorency, Choiseul, Polignac, &c.; some Spanish lawyers, cardinals, and priests, under the Empire; the Captain of the Meduse, under the Restoration; and, in 1830, the signers of the *ordonnances*, Peyronnet, Polignac, &c.; then the Duchess de Berry and Louis Napoleon.

But still later historical associations are connected with Ham. When Louis Napoleon effected his *coup d'etat*, once more its walls opened to the reception of great men. In France, it seems, there are four state fortresses. The greatest number were conducted to the cells of Mazas, by many degrees the most uncomfortable of the four—so bad, indeed, as to make transportation even to Mont Valerien or Vincennes, much more to Ham, a boon for which to be thankful. At Mazas the representatives were kept for several days in profound secresy, seeing no one, and allowed no other books than those accorded to ordinary prisoners, such as the "Imitation de Jesus Christ" of Thomas A'Kempis, the "Livre des Frères," and other volumes from the "Jesuits' Library for the Million." The cells at Mazas are furnished with a hammock, which is taken down every morning at a stated hour. In consideration of their being "Deputies of France," however, the representatives were allowed to keep their hammocks suspended as long as they pleased, and to slumber *ad libitum*. At the end of a few days, moreover, instead of being deprived of light, like the other prisoners, at the regular prison hour, they were allowed to purchase their own "bougie." Their food was the prison diet, with the liberty of purchasing something different, if not better, at the "cantine." Their meals were brought on tin dishes, with the appendage of wooden spoons, so untempting to the eye that one of the representatives recently set free declares that during the fifteen days of his imprisonment he invariably ate with his fingers—"comme un sauvage, ou un Kabyle." The representatives were turned out of Mazas with as little ceremony as that which accompanied their arrest. The "gardien" of the prison came to them and said, with laconic coolness, "Get ready, put up your things, you are going down into the 'greffe'" ("bureau," or office); and in reply to their demand for what reason, exclaimed with perfect sang froid, "I don't know, but you must go down." At the "greffe" an official addressed them, "I have orders to set you at liberty; go out by this door." Each of the representatives was then conducted to the threshold of the inhospitable fortress, embarrassed with his luggage, in the midst of soldiers and "agens de police," who found ample subject for mirth in their grotesque situation. As an instance of the vicissitudes of sublunary affairs, M. de Tocqueville, who introduced the cellular system of imprisonment into France, and M. Chambolle, who so long and zealously defended Mazas from the attacks to which it was subjected, were both enabled to weigh, by personal experience, the advantages of the system they had advocated. For the future it is probable they will be less lavish of their praises.

At Ham nearly similar treatment seems to have been pursued towards the state prisoners. Not only were they not permitted to communicate with anybody outside the prison, but they were completely separated from each other, and their keepers were enjoined to observe perfect silence towards them. Every other accommodation, however, was granted them consistent with their safe keeping. After having been detained in solitary confinement during ten days, they were allowed to meet and converse together. Their friends and families were likewise permitted to visit them. The following prisoners still remain at Ham:—Generals Changarnier, Bedeau, Lamoricière, Le Flo, Colonel Charras, and M. Baze. They all dine together, and are waited on by non-commissioned officers, who treat them with the greatest respect. The wives of Generals Lamoricière and Le Flo and M. Baze share the captivity of their husbands, and by the affability of their manners and the charms of their conversation beguile the tedious hours of captivity. Madame Le Flo has had the misfortune to lose one of her children since her arrival at Ham. General Changarnier, whose cold and sarcastic stoicism presents a strong contrast with the impetuous vivacity of Colonel Charras and the energetic ardour of General Lamoricière, has resumed, notwithstanding his imprisonment, that impassive character and that immobility which have distinguished him during his public life. He speaks in short sentences, and it is always difficult to discover the secret idea which occupies that grave and serious head. Generals Changarnier and Lamoricière occupy the same apartment. The latter, with that rapidity of intelligence which distinguishes him, very quickly comprehended the bearing and the character of the act of the 2nd of December, and he readily resigned himself to a fact which has been confirmed by force. Colonel Charras appears to regret bitterly the course pursued by the Republican Opposition during the last sittings of the Assembly. He admits the enormous fault committed by the Republican party in allying itself with Socialism, the defeat of which produced by a movement of irresistible re-action the fall of the Republic itself. None of the prisoners is so dejected as M. Baze. He fears that he is more compromised than the others, in consequence of the documents seized at his residence. M. Baze is not possessed of any personal fortune, and he dreads that he may be reduced to indigence in case of banishment from France. General Bedeau has, it is said, assumed the entire responsibility of the documents discovered at M. Baze's lodgings. It was General Bedeau who caused those decrees to be prepared and printed, and he is astonished that anybody should suspect his military honour of conspiring against the chief of the Executive Government, nor do the documents seized demonstrate in the remotest manner the existence of any such conspiracy. General Bedeau's reputation, moreover, for high honour and the purest morality, is a sufficient guarantee for his innocence. It is to be hoped, therefore, that now that the President of the Republic has secured 7,000,000 votes, he will order the release of those distinguished captives.

THE MARINE OR WATER TELESCOPE.

It consists of a tube of metal or wood, of a convenient length, to enable a person looking over the gunnel of a boat to rest the head on the one end, while the other is below the surface of the water; the upper end is so formed that the head may rest on it, both eyes seeing freely into the tube. In the lower end is fixed (water-tight) a plate of glass, which, when used, is to be kept under the surface of the water. A convenient size for the instrument is to make the length three feet, and the mouth, where the face is applied, of an irregular oval form, that both eyes may see freely into the tube, with an indentation on one side to facilitate breathing, so that the moisture of the breath may not be thrown inside of the tube. Handles for holding the instrument are to be affixed to each side. The glass at the extremity of the tube should be surrounded with a rim of lead, one fourth of an inch thick and projecting forward three inches, so as to form a continuation of the tube. The weight of the lead serves both to sink the tube and in some measure to protect the glass. Holes should be made at the junction of the rim with the glass, in order to allow the air to escape and bring the water in contact with the glass.

The reason why we so seldom see the bottom of the sea or of a pure lake, where the depth is not beyond the powers of natural vision, is not that the rays of light reflected from the objects at the bottom are so feeble as to be imperceptible to our senses, from their passage through the denser medium of the water, but from the irregular refractions given to the rays in passing out of the water into the air, caused by the constant ripple or motion of the surface of the water, where that refraction takes place. Reflections of light from the surface also add to the difficulty, and before we can expect to see objects distinctly at the bottom, these obstructions must be removed. This is done to a very great extent by means of the water telescope; the tube serves to screen the eyes from reflections, and the water being in contact with the glass plate, all ripple is got rid of; so that the spectator, looking down the tube, sees all objects at the bottom, whose refractive powers are able to send off rays of sufficient intensity to be impressed upon the retina, after suffering the loss of light caused by the absorbing power of the water, which obeys certain fixed laws proportionate to the depth of water passed through; for as the light passing through pure sea water loses half its intensity for each 15 feet through which it passes, we must from this cause alone, at a certain depth, lose sight of objects of the brightest lustre. The freedom of the water from all muddy particles floating in it forms an important element in the use of the water-telescope; for these act exactly in the same way, in limiting our vision through water, as a fog does through air. In a trial made with the instrument on the coast of Scotland, the bottom (a white one) was distinctly seen at the depth of 12 fathoms; and on a black rocky bottom, objects were so distinctly seen at 5 fathoms under water that the parts of a wreck were taken up, the position of which was not known previous to its use.

THE LADIES' DEPARTMENT.

INSTRUCTIONS IN EMBROIDERY.

(*Continued from page* 32.)

Of all kinds of embroidery we intend giving specimens in such articles as may be most fashionable; and we therefore begin by furnishing our readers with the clearest possible instructions for each kind of work.

The first operation is to mark the design on the material to be worked, which is done by means of what is termed a *pounced* pattern; to prepare this, draw the design accurately on thick letter-paper, and then with a very coarse needle *prick all the outlines*, making the little holes at the distance of about one-eighth of an inch apart. Lay the material to be worked very smoothly on the table, and the paper pattern over it; place weights to keep them firmly down, and rub all the design over with fine pounce, so that every hole may be penetrated with it. The best instrument to use is a large flat stump, made of a roll of linen.

Should the material be white, a little finely powdered charcoal may be added to the pounce, as it does not soil the most delicate satin.

When the whole design is pounced, remove the paper, and trace over the design with a fine sable brush dipped in a solution of colour, mixed with varnish and spirits of turpentine. The colours used should be artist's bladder colours, and it is desirable to choose a colour that will show clearly on the material. If the embroidery be in one colour only, however, the same colour should be used to mark it.

This mode of marking is applicable to coloured embroidery, and braiding on any thick material. For marking a design on muslin or cambric, draw the pattern first on paper and ink it. Then lay it under the muslin, and trace the design with a quill pen, or a fine brush dipped in a solution of stone blue in thin gum water. This washes out very easily.

Should the halves or quarters of any pattern correspond (as in a sofa cushion, for instance), draw only *one half*, or *one quarter*, as the case may be, on the paper; fold the paper in two or four, keeping it very exact, and prick through all the folds at once. This ensures much greater accuracy than can be obtained by drawing the whole pattern.—(*To be continued.*)

POINT LACE COLLAR.

MATERIALS.—Evans's Mecklenburgh threads, Nos. 80, 100, and 120; Evans's boar's-head cotton, No. 60.

Half the collar being given in the engraving, a perfect collar must be drawn from it, and lined with merino; then trace all the outlines in Evans's Mecklenburgh thread, No. 80. The design is to be worked from the diagrams of the stitches already given. All the stems and other parts marked *a* are to be done in 100 Mecklenburgh, *b* in 120, *c* in 60, *f*, 120.

Some modern point lace stitches, which are introduced as the Mechlin lace wheels, will be found in THE ILLUSTRATED EXHIBITOR, No. 15.

The connecting bars are the Raleigh bars, which are also described in the same place, and are to be worked with Evans's Mecklenburgh thread, No. 100.

The edging is outlined with 80; the inner row of loops in a continuous line, the outer ones all separately, the ends being worked on in covering them with close button-hole stitches and dots at intervals, like those in the Raleigh bars. When the collar is finished, cut the thread at the back, and detach it from the paper, carefully picking out all the ends.

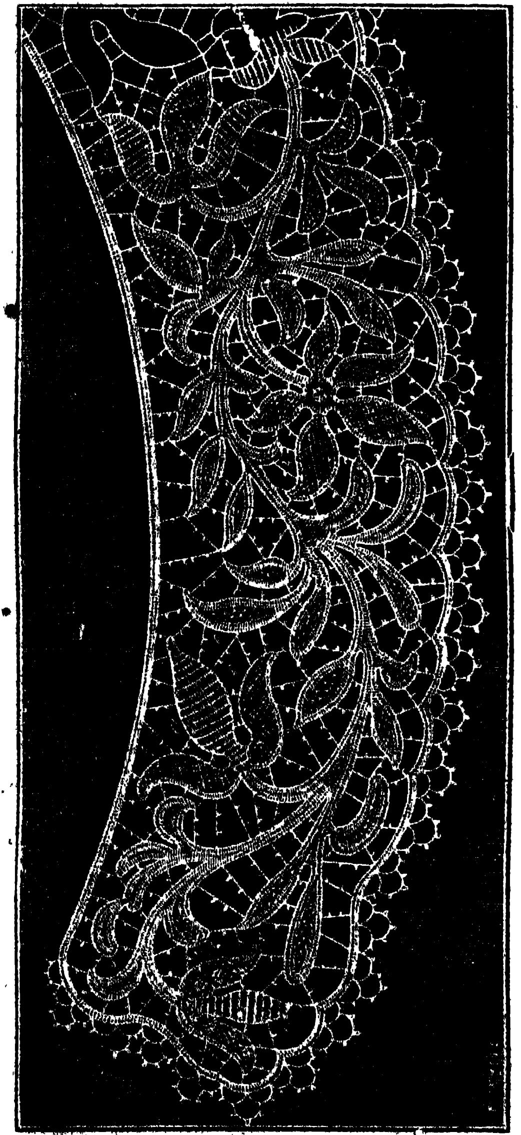
ANTIQUE POINT LACE STITCHES.

Having already spoken of the beauty and value of antique point lace, and the profitable employment it promises to afford to ladies of limited income, it only remains for us now to describe the manner in which it is worked.

We give diagrams of some of the stitches found in the most ancient specimens; few as they are in number, a combination of them in flowers and leaves affords a great and beautiful variety of lace; and at some future time we will add such as more elaborate specimens require.

Antique point lace is worked on a foundation of cambric braid, or thread. We will at present confine ourselves to the process used when the last-mentioned material is employed.

The pattern is drawn on pink or green glazed paper (which must not be of the thinnest description), and is lined with a bit of merino or alpaca. *It is then to have all the outlines carefully traced in thread,* which is *laid on* and sewed over. The thread used *for these outlines* is manufactured expressly *for* the purpose, as is the case with a great proportion of the point-lace threads: it is called Evans's Mecklonburgh Thread. It is a rather coarse material, and a finer thread is used to keep it down. To do this, make a knot in the needleful of fine thread, bring up the needle where the outlining commences, and draw it to the wrong side again through the same hole, having crossed the coarser thread. The next stitch must be taken at the eighth of an inch from this one, and so on; taking care that every point and angle is properly formed. When the whole pattern is thus traced in thread, it is formed into the solid mass in which it afterwards appears by means of the stitches given in the accompanying diagrams.



POINT LACE COLLAR.—(*See page* 47.)

(a) Foundation Stitch.—Worked with Evans's Mecklenburgh, No. 120. Take a bar of thread, parallel with the outline, and at the twelfth of an inch from it; over this bar work a succession of button-hole stitches very closely. When you come to the edge, twist it once over the outline thread, and take the thread across again to work the next row. Repeat.

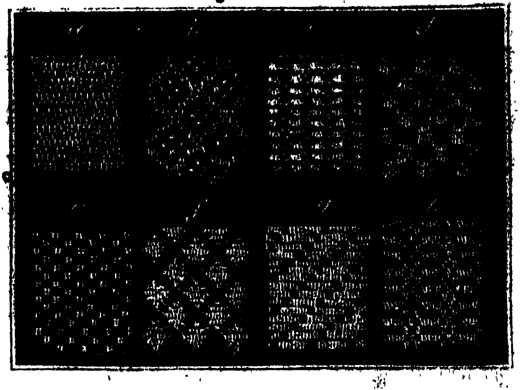
(b) Open Diamonds.—1st Row: 8 plain Brussels stitches close together, a small loop (which is made by missing the space of one stitch), 8 plain, 1 loop. Repeat.

2nd Row: 5 plain on the middle of the 8 plain, miss the two last of the 8, work 2 plain in the loop of the first row, miss two after next 8, work 5. Repeat.

3rd Row: 2 plain in the centre of the 5 plain, × 2 plain in the 1st loop, 2 plain in the next loop, 2 plain on the centre of the 5 plain, × repeat.

4th Row: 5 plain (the two last coming into the first of three loops), 2 plain in next loop, 5 plain (the two first and two last coming in loops), 2 plain in next loop, 5 plain (the two first and two last in loops). Repeat.

5th Row: 8 plain (the two last coming in the first of the loops of the last row), miss the two plain stitches in the last row, 8 plain (commencing in the second loop of the last row), miss the two plain. Repeat.



POINT LACE STITCHES.

(c.) Barcelona Lace.—1st Row: Take a button-hole stitch, long enough to allow 4 close button-holes to be worked on it. On the loop so formed work 1 tight button-hole stitch, take another at half the distance, and work another tight stitch on it. Repeat.

2nd: 4 close stitches on the long stitch of last row, 4 close stitches on the next, missing the intervening short one. Repeat.

3rd: Take a long stitch on the bar of thread between the first four and second four, × work a tight button-hole stitch on it. Repeat on the same bar. Take a stitch to the next bar, missing the 4 close stitches. × repeat.

The 2nd and 3rd rows, completed, form the lace.

(d.) Fan Stitch.—1st Row: 6 plain stitches, miss the space of six. Repeat.

2nd: 6 stitches on the last 6, miss the same space, 6 on the next. Repeat.

3rd: 6 plain in the loop, leave a long loop of thread, 6 plain in the next loop. Repeat.

4th: 6 plain on the last 6, 6 on the long loop. Repeat.

5th: 6 plain on the 6 over the long loop, miss to the 6 over the next loop. Repeat.

6th: Like 3rd.

Repeat the last three rows, working the lines of this pattern throughout, backwards and forwards.

(e) Spotted Lace.—1st Row: 2 plain Brussels, leave the space of two, 2 plain, leave the space of two. Repeat to the end.

2nd Row: 2 plain in every loop. Every succeeding row is like the second.

(f) Antwerp Lace.—1st Row: The same as first row in b.

2nd: 5 plain in centre of 8 plain, 2 plain in the loop. Repeat.

3rd: 2 plain in the centre of 5 plain, 5 plain (commencing and ending in the loops of the last row). Repeat.

4th: 2 plain in the centre of 5 plain of the last row, 5 plain (commencing and ending in the loops of the last row). Repeat.

These four rows form one pattern, and must be repeated as often as may be required.

(g) Escalier Stitch.—4 plain stitches, miss the space of two. Repeat.

2nd (and all future rows): × 9 plain (the two first worked on the loop), miss the last two of the 9 in the previous row. × repeat.

(h) Cadiz Lace.—6 plain stitches, miss the space of two, 2 plain, miss the space of two. Repeat.

2nd Row: 2 plain on the space, miss over the stitches of the last row, whether two or six; 2 plain in the next space, miss the next stitches. Repeat.

These two rows, repeated alternately, form this lace.

WORKS OF GREAT MASTERS.

THE VEGETABLE MARKET AT AMSTERDAM.—BY GABRIEL METZU (DUTCH SCHOOL).

Mrs. Jameson, in her valuable work on the "Private Picture Galleries of Art in London," has divided painters into three sections. We have the Italian, Spanish, and French schools; the Flemish, Dutch, and German schools; and, thirdly, the painters of our own country.

In the accompanying engraving we present our readers with a specimen of the Dutch painters; and a favourable specimen, for Metzu was one of the first in his class. The Dutch painters, it may be proper here to state, are those who flourished in the Low Countries, particularly at the Hague, Leyden, Amsterdam, and Haarlem, towards the end of the sixteenth and throughout the seventeenth century; and here, as in the Italian schools, we find the earliest the *best*, and the latest the *worst* painters of their class. In the highest rank we place Jan Steen, Teniers, and Adrian Van Ostade, as delineators of plebeian life and character; Terbung Netzcher and Eglon Van Deer, next, as painters of elegant social life; Gerard Douw, Gabriel Metzu, and Franz Mieris, as the most refined portrayers of common life and domestic incident; De Kirghe and Vander Hayden, as imitators of purely natural effects of perspective and light. Hobbima, Ruysdael, Adrian Vander Velde, and Cuyp, stand perhaps at the head of a long list of landscape painters. Paul Potter was confessedly the greatest cattle painter, as Wouvermans was the best painter of equestrian subjects, in the world; and for sea pieces merely,

Wilhelm Vander Velde and Ludolph Backhuysen are considered unrivalled. All these painters, says the accomplished critic to whom we have already referred, however they might differ in the selection of their subjects, and in the individual manner of treatment (easily discriminated by a little practice and observation), had taken that direction which had been given to the national taste and genius by the influence and example of Rubens. They were distinguished generally by two characteristics: first, the most lively and intense perception of natural forms and effect; and, secondly, the development of the faculty of colour. Some finished more, and some less, but all were exquisite imitators and colourists. Sir Joshua Reynolds has summed up their merits in his usual masterly style. "One would wish," he says, "to be able to convey to the reader some idea of that excellence the sight of which has afforded so much pleasure; but as their merit often consists in the truth of representation alone, whatever praise they deserve—whatever praise they give when under the eye, they make but a poor figure in description. It is to the eye only that the works of this school are addressed; it is not therefore to be wondered at that what was intended solely for the gratification of one sense succeeds but ill when applied to another. A market-woman, with a hare in her hand, a man blowing a trumpet; or a boy blowing bubbles; a view of the outside or inside of a church—are the subjects of some of their most valuable pictures; but there is still entertainment even in such pictures. However uninteresting their subjects, there is some pleasure in the contemplation of the truth of the imitation. But to a painter they afford likewise instruction in his profession. Here he may learn the art of colouring and composition, a skilful management of light and shade, and, indeed, all the mechanical parts of the art, as well as in any other school whatever. The same skill which is practised by Rubens and Titian in their large works is here exhibited, though on a smaller scale. Painters should go to the Dutch school to learn the art of painting, as they would go to a grammar school to learn languages. They must go to Italy to learn the higher branches of knowledge. We must be contented to make up our idea of perfection from the excellencies which are dispersed over the world. A poetical imagination, expression, character, or even correctness of drawing, are seldom united with that power of colouring which would set off those excellencies to the best advantage; and in this, perhaps, no school excelled the Dutch. An artist, by a close examination of their works, may in a few hours make himself master of the principles on which they wrought, which cost them whole ages, and perhaps the experience of a succession of ages to ascertain."

Such, then, is the Dutch school, in the opinion of the great teachers of art. We now come to speak of one of its brightest ornaments—Gabriel Metzu—who was born at Leyden, 1615. We know little—far too little—of this exquisite artist. Mrs. Jamieson says: "Of this elegant painter, I regret to say, that little is known, and that little is sad. He is said to have injured his health by too close application to his art, and to have died under a painful operation. His small conversation pieces are distinguished by a graceful feeling in the choice of his subjects, and he painted with a freer and more sparkling touch than either Mieris or Gerard Douw, though he did not finish quite so elaborately." It is said these artists were his models; yet there is a remarkable difference in the touch and pencilling between them. Metzu's pictures are held in universal esteem, owing to his exactness in drawing and delicacy in colouring. Pilkington says he approached near to Vandyke in his manner of designing the hands and feet of his figures; the countenances had usually infinite grace, a distinguishing character, and strong expression, and his pictures have abundance of harmony. His subjects were usually taken from low life, such as women selling fish, or fowls, or fruit—sick persons visited by the doctor—chemists in their laboratories—and scenes equally commonplace; but everything he did was well done. He was no slovenly artist, but the reverse. He spent much time on his pictures, which has occasioned their scarcity; and it is said that the Dutch, as much as possible, prevent their being carried out of the country. We much, however, question this statement. If history be true, much as the Dutch love art, they love money better. Still it is true that Metzu's paintings are but rarely seen. We believe we have but eleven of them in London: six in the Queen's Gallery at Buckingham Palace—three in the collection of Lord Francis Egerton, known as the Bridgewater Gallery—and two in the collection of the late Sir Robert Peel. The preponderance of Metzu's paintings in the Queen's collection is accounted for by remembering that that collection was formed by George IV., whose exclusive predilection for pictures of the Dutch and Flemish schools is well known. Some of these pictures have obtained high prices. "A Young Girl Selling Grapes," in Metzu's earlier manner, originally from the collection of M. Newman, of Leyden, now in that of her Majesty, was sold in 1806 for £252. "A Lady Caressing a Little Spaniel," in the Bridgewater Gallery, was purchased for [illegible] "A Music Lesson" was bought by the late Sir Robert Peel for [illegible] guineas; and "The Duet" was sold to the same [illegible] for 450 guineas.

The value set upon Metzu's works has led to many imitations of him. Metzu commonly painted in a small size. The subject of his largest picture is a number of men and women in a [illegible]'s shop. It is described as being excellent in the disposition and correct in the design; the naked flesh being so soft and melting, and the colouring so clear, that it is admirable; the silks and stuffs are curiously and neatly distinct, and their different texture and folds represented with such truth and ease, that the painting affords the greater delight the more minute is the examination of it. The attitudes of the figures are well chosen, and everything appears so natural, that nothing seems wanting to its perfection. Another picture of Metzu, representing a lady washing her hands in a silver basin held by her woman, is an exquisite performance. But one still better is a lady tuning her lute. The face is beautifully formed and painted with the utmost delicacy, the flesh and life being imitated with uncommon force and spirit; and if the hands had been more correct, the whole would not have been unworthy of Vandyck. We have little more to say of Metzu. We have already intimated that in his devotion to art he sacrificed his life. Being severely afflicted with stone, he died under an operation he submitted to in the hope of cure. The date of his death was 1658; but if, as Campbell writes,—

> "To live in hearts we leave behind,
> Is not to die,"

Metzu still lives; for still admiring eyes hang on his works, and the lover of art gratefully preserves his name.

The picture we engrave—the original of which is preserved in the Museum of the Louvre—is esteemed Metzu's masterpiece, and is valued at £1,750. Five other of his pictures adorn the walls of the Louvre. They are a "Portrait of Admiral Tromp," "A Soldier presenting Refreshments to a Lady," "A Lady peeling an Apple," "A Woman drinking Beer," and "A Chemist sitting at a Window reading."

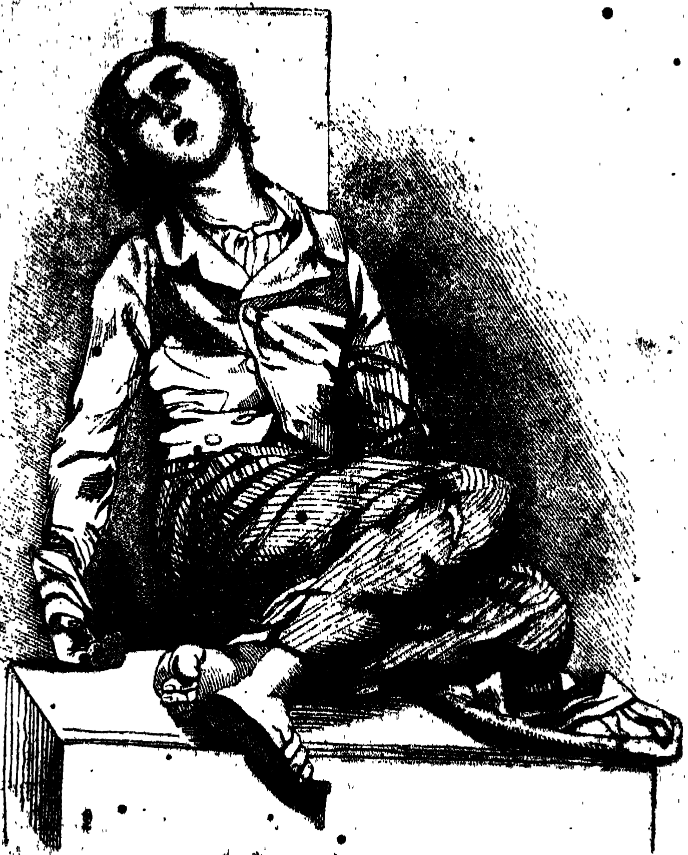
But we have no space left for them, but must turn to the "Vegetable Market of Amsterdam." How graphically has Metzu preserved for us its characteristics! The women on the left quarrelling, and one of them, with arms a-kimbo, evidently pouring forth a torrent worthy of Billingsgate—the gay youth whispering into the not unwilling ear of the Dutch maiden, who, listening to him, has forgotten altogether that she has come to market—the dog, availing himself of his master's [illegible] to make an attempt on the poor bird, who evidently prefers [illegible] to his company—the broad elm [illegible]—and the sleepy adjacent canal. These the painter has immortalized! He has given us a picture of Dutch life—still and phlegmatic—in the market-place, on 'change, or when at home, the Dutchman moves by the side of his [illegible] unconscious that as the clouds from his pipe [illegible] themselves around his contented face, so his brain gradually becomes surrounded with fog. In these days of bustle and railroads and steamships, we look at such pictures as Metzu's, and wonder what manner of men and women were they who could thus calmly and quietly live, where we pant, and toil, and madly strive.

SCULPTURE.

OLIVER TWIST, BY MR. W. HUGHES, BOSTON, U.S. EXHIBITED IN THE CRYSTAL PALACE.

The highest manifestations of the sculptor's art are not always those in which he has embodied the most ambitious thoughts. Heroic forms and reproductions of the mythological fancies of an older world are not necessarily those in which the genius of the artist are best developed. But it often happens that the most meagre thought becomes ennobled under the hand of him who throws his soul into the work. The poetic mind creates. And thus it is that some few groups recovered from the tomb of ages appeal with irresistible force to the universal heart of mankind. Who can gaze upon the Laocoon of Agesandir, for instance, without sympathising in the agony of the father struggling with his sons in the folds of the deadly serpent? Just as it is described by the elder Pliny, so this celebrated group exists at the present moment in the Vatican at Rome. And, if we pause in thought a moment, we can almost realise the rapture of him who, torch in hand, exploring the ruins of the baths of Titus, drew from its long concealment this glory of the world three hundred years ago.

From the very earliest times, and among the rudest tribes, there has ever existed a desire to express by outward forms the workings of the inward mind. And to this irresistible tendency we owe whatever is noble in the arts—the masterpieces of poetry, painting, and sculpture. Though the appliances varied, the end was the same—the pen, the pencil, and the chisel being indifferently employed in embodying and eliminating the undying thoughts of man. Thus, traces of the imitative art are alike discoverable amid the ruins of past ages and in the rude efforts of the untutored savage. Wherever an altar was raised, or a tomb erected, there we are sure to find the marks of the universal feeling—[illegible] alike by the [illegible] and the spectator.



OLIVER TWIST.—W. HUGHES, BOSTON, U.S.

The appreciation of what appeals immediately to the feelings, is the secret of the popularity artists and the imitative arts enjoy. Unlike the poet, who can carry his audience with him through a succession of incidents, the painter and the sculptor must seize the salient point of a story at a single moment of time; and if this be done successfully, and the incident be one which can be comprehended at a glance, a great work has been achieved, and another name added to the glorious list of those whose reward is immortality!

Our meaning will be at once apparent if the reader but takes the trouble to walk again, in thought, from end to end of that glorious building, and note down, in his mind's eye, the sculptures which most attracted him. They were not those to which the highest prizes have been awarded, wonderful as are the Amazon, and the Cœur-de-Lion, and the Phryne, and the Glycera, considered as works of art; they were not even the Godfrey of Bouillon or the St. Michael;—but they were those in which the story was at once apparent—the "Eagle Slayer," the "Boy at a Stream," "Satan tempting Eve," "Virginius and his Daughter," the "Lion in Love," "Ishmael in the Desert," the "Greek Slave," "Oliver Twist," and the "First Step."

Not that we pretend for a moment that these were the most capital works in the Exhibition. By no means; for there were many others which, doubtless, take higher rank, and many in which the skill of the artist was more apparent; in the anatomical and historical details, for instance. What we contend for is, that the statues we have named were perfect in those attributes which appeal to, and can be understood by, all classes of spectators, the peasant no less than the peer. It may perhaps be said that if sculptors took lower ground, if they strove to illustrate the present rather than the past, such a tendency would affect the value of their productions as works of art. We think not. The ancients immortalised the poetry and legends of their age on pictured canvas and chiselled marble. Are not the works of modern times as capable of illustration? At any rate, it must be conceded that Shakspeare, and Walter Scott, and Byron, and Dickens have created characters on paper which would at once be recognised in marble; and that the incidents of domestic life are as well worthy realization as fancies taken out of the heathen mythology.

This last sentence brings us at once to the consideration of the original of our picture; which is a realization of one of Mr. Dickens' most popular heroes the poor orphan, Oliver Twist.

Mr. Hughes, of Boston, United States, is, we understand, the sculptor from whose chisel has proceeded this happy delineation of what is considered by many as one of the novelist's finest creations. The moment chosen by the artist is that in which the poor orphan, having been dropped by the burglar Sykes in his hurried escape, has made his way back again to Mr. Maylie's door. Wounded, fatigued, and wretched, the miserable lad has set himself down, apparently uncaring whether he lives or dies. Poverty, privation, and the dark scenes in which he has been made to take an unwilling part, have almost dried up the well-spring of Hope within his breast, and he sits the picture of despair and hard reality. The figure, as we have intimated, belongs not to the highest class of poetical creations; but it has, nevertheless, the merit of realising to the fullest extent the picture drawn by our fancy of what the Oliver Twist of Dickens really was. Forlorn and neglected, the parish orphan of Mr. Hughes is a successful embodiment of the character as it exists in the pages of the novel. Though it obtained no prize, it is without doubt a very meritorious work of art.

MASSANIELLO, AND THE REVOLUTION IN NAPLES, IN 1647.

The disputes between France and Spain, in the seventeenth century, regarding the succession to the throne of Naples, plunged the whole of Italy in discord and confusion. The ascendancy was now obtained by one party, now by another, but all the loss and miseries of the war were entailed upon the unfortunate inhabitants. At length Ferdinand the Catholic, King of Arragon, succeeded in obtaining the mastery, and subjected Naples to his sway. The continual contentions of the crown, the aristocracy, and the people, during the following century, introduced into the country some semblance of a constitution. Assemblies or Parliaments were held from time to time to consult upon measures affecting the common welfare; but, at length, everything of this kind gave way before the feudal system, which was now for the first time established in full vigour. The natural consequence was, that the condition of the lower classes became still worse. The barons obtained unlimited power over their lives and property, and used it with merciless severity.

The king sought to conciliate the aristocracy by the sacrifice of the common people, but he soon saw the folly of a course of policy which plunged the kingdom into misery, and left it without defence against foreign invasion.

Under the Spanish rule, few, if any, assemblies were held. The administration of Naples was placed entirely in the hands of a viceroy. The power of the Crown being thus greatly extended, proportionately greater revenues were required to support it; and the weight of the taxes, and the vexatious mode of collecting them, were the cause of loud and general complaint.

In the year 1647 a tax was laid upon fruit brought into the city, whether fresh or dried; and, as this forms in Italy the food of the masses, a tremendous commotion was excited. Thomas Anello, by an Italian familiar mode of abbreviation usually called Massaniello, at that time in his twenty-fourth year, dwelt in a corner of the great market-place of Naples. He was a stout man, of good countenance, and of the middle stature, whose profession was to buy fish and retail them; and, in conformity with the meanness of his condition, usually appeared in a coarse shirt, a blue waistcoat, a mariner's cap, and with naked feet. Observing the general murmurs of the people, and while in the highest state of exasperation himself, he met a famous bandit, called Perrone, with one of his companions, who asked him what ailed him. He replied, in great wrath, "I will be bound to be hanged, but I will right this city." Those whom he addressed of course laughed at him; but he contrived to make them see the possibility of an effective resistance, and they engaged themselves to assist him. He first applied to the owners of the fruit-shops, and recommended them to come the next day to the market, but to

MASSANIELLO.—FROM A PAINTING BY M. SPADARO.

decline to purchase from the growers any portion of their taxed fruit, and in the meantime instructed, and to a certain extent [illegible], many hundreds of the more youthful lazzaroni who frequented the market-place, teaching them to utter cries and to clamour in concert, as he should direct. Of this militia he made himself the leader; and at a signal being given by a fruiterer in the confederacy throwing his taxed fruit to the ground in a rage, and exclaiming, "God gives plenty, and the Government dearth," a tumult ensued, and a general cry of "No Tax" burst from the assembled multitude, who pelted the magistrate, sent to appease them, from the market-place. The immediate consequence was a large concourse of people of all descriptions, when Massaniello leaped upon the table of one of the fruiterers and harangued the crowd, comparing himself to Moses, who was sent to deliver the Israelites from the Egyptians, and to Peter, also a fisherman, who had rescued the world from the dominion of Satan. At last, however, [illegible] completed, and he went in state to visit the viceroy, [illegible] of silver, and mounted upon a lofty charger, with 50,000 persons in his train, who attended to his smallest sign with the most devoted obedience. On the following Sunday the capitulation was signed, and solemnly sworn to; and had Massaniello now retired, as he had declared his intention to do, he might have presented some claim to the title of a friend to his country; but, unhappily, he was induced to maintain his authority, and the usual effects of unlimited power began to display themselves in acts of caprice and tyranny, which at length were of so extraordinary a nature, that they were attributed to [illegible] arising out of the high state of excitement which he had experienced since the commencement of these transactions, during which he suffered his unremitted exertions with little either of food or rest. The strong wines that he drank after his elevation are also supposed to have produced a species of delirium which unsettled his reason. Be this as it may, he was so capriciously tyrannical that a scheme was laid for his assassination, and as he fell, he only exclaimed "Ungrateful Traitors!" His head was thrown into one ditch, and his body into another; but (and the lesson is salutary) the temper excited by these events did not cease until Naples was freed from the yoke of Spain.

One of the strangest parts of this strange affair was the connection of many of the great Italian artists with it. Salvator Rosa was thirty-two years of age at the time of the tumult, and Micco Spadaro, from whose paintings our engravings are taken, was thirty-five. Both of them, and all the other Neapolitan artists of the day, fought with Massaniello against Spanish domination. Amongst them were Aniello Falcone, the intimate friend of Spadaro, Cadagora, Coppola, Porpora, the two Bascaro, &c. All these painters formed a distinct corps, known as the *Death Company*, and chose Falcone as their leader.

Massaniello had no more devoted adherents; and it must for ever form a subject of regret, that a revolution which owed so much to their courage had not a happier end. That it was called for, no one can doubt, for the political grievances must be great indeed when the artists of a country abandon the brush and the pencil for the sword. If ever foreign domination was odious and oppressive, it was that of Spain over Naples. One of its viceroys, Count Monterey, was accustomed to say, "that as Naples must, one day or other, fall into the hands of the French, Spain should take all she could out of it while she had it." This maxim was acted upon by all who had anything to do with the administration. The people were fleeced without mercy for the payment of taxes imposed in the name of the king, and though these exactions reached to a considerable amount of yearly revenue, they were small when compared with the sums extorted by arbitrary violence. More than thirty thousand Neapolitan subjects were thus compelled to abandon their native country, and settle in the dominions of the Sultan. To the eternal disgrace of the Spanish Administration, they afterwards declared that, "while ten pistoles from each man were not sufficient to pay the salt tax alone in Naples, ten carlins paid all the taxes in Turkey."

MASSANIELLO AT THE HEAD OF THE POPULACE.

The fall of Massaniello obliged the artists to fly from Naples on the approach of John of Austria, and the new viceroy appointed by the Spanish government. Salvator Rosa took refuge in Rome and there found fame and fortune; the others dispersed; but what became of Spadaro is not known.

In our portrait Spadaro has evidently only taken a one-sided view of Massaniello's character. Although his friend and admirer, he has evidently made no attempt to give him any traits of nobleness or dignity. This is believed by many, that it was not the will, but the way, that was wanting. It was reserved to Salvator Rosa, who was also familiar with the features of Massaniello, to hand down to us whatever there was of force and gravity in the aspect of the popular hero: from Spadaro we have received only the comic and trivial.

This episode in the history of modern Italy is but one of the many glorious efforts which now and then appear, like words of power and beauty, scattered at rare intervals through the pages of a hideous tragedy. The vices of the Roman Empire seem to have left behind a heritage of curses and misery, which is to cleave to its descendants evermore. The centre of liberty, of literature, and art, has become the cradle of despots, and the haunt of vice, profligacy and murder.

The history of Naples is hardly instructive, and in many parts is utterly disgusting. Since the downfall of Rome it has been subjected in succession to a series of masters, nearly all of foreign extraction, and has distinguished itself not less by its vices than its patient submission to slavery.

Still, from time to time, might be observed some faint and short glimmerings of the spirit which animated the Roman plebeians in ancient times. Massaniello has furnished a striking instance of what may be achieved amongst the Italians by a courageous and determined man. Perhaps no finer materials ever existed for genius and strength to work upon. Ardent, passionate, enthusiastic, and vain-glorious, they have within them all the materials of revolution, but none of the sober and steady education which facilitates progress and civilisation.

A VISIT TO APSLEY PELLATT'S FLINT GLASS WORKS.

How many of the comforts we enjoy in our national and domestic character are due to accidental discoveries! Witness that recorded by Pliny, when some mariners, "who had a cargo of nitrum (salt, or perhaps soda) on board, landed on the banks of the river Belus, a small stream at the base of Mount Carmel, in Palestine, and, finding no stones to rest their pots on, placed under them some masses of the nitrum, which being fused by the heat with the sand of the river, produced a liquid and transparent stream." Some modern writers have been disposed to doubt the truth of this relation; but that the origin of glass is due to some such fortuitous liquefaction, is proved by the fact that imperfect forms of "glass" are usually found in the sides of almost every furnace where sufficient heat has existed to vitrify the bricks, and in the ruins of buildings destroyed by fire. "It might dispose us to a kinder regard for the labours of one another," wrote Dr. Johnson, more than a hundred years ago, "if we were to consider from what unpromising beginnings the most useful productions of art have probably arisen. Who, when he first saw the sand or ashes, by a casual intenseness of heat, melted into a metallic form, rugged with excrescences and clouded with impurities, would have imagined that in this shapeless lump lay concealed so many conveniences of life as would, in time, constitute a great part of the happiness of mankind?" Who, indeed! "And yet," continues the doctor, in his sententious but admirable way, "the first artificer of glass was employed, without his knowledge or expectation, in facilitating and prolonging the enjoyment of light, enlarging the avenues of science, and conferring the highest and most lasting pleasures: he was enabling the student to contemplate nature, and the beauty to behold herself."

It may be as well, perhaps, before speaking of the manufacture of glass—a material which owes its value entirely to the labour expended on its production, the sand, soda, and chalk being almost valueless of themselves—to glance briefly at

THE KNOWLEDGE OF THE ART AMONG THE ANCIENTS.

That in Egypt, the mother of nations and nursery of the arts, a kind of glass was made, is abundantly evident, from the fact of beads, and other vitrified objects, being discovered in tombs; and Sir J. G. Wilkinson adduces three distinct proofs that the art of glass-making was known to the Egyptians before the exodus of the children of Israel, more than three thousand five hundred years ago. There exist at Beni-Hassan and at Thebes rude delineations of glass-blowers at work; and, from the hieroglyphic descriptions of the paintings, it appears that they were executed in the reign of the first Osistasen, who occupied the throne about the period above mentioned. Again, Captain Hervey found, at Thebes, a glass bead about three quarters of an inch in diameter, which Sir J. G. Wilkinson proves to bear the name of a king, in hieroglyphic characters, who reigned fifteen hundred years before the birth of Christ; and lastly, Winckelman, a very high authority in matters of art, is of opinion that the use of glass among the Egyptians was much more common than is generally supposed, not only for drinking vessels and sacred emblems, in Mosaic work, but even for coffins, but no specimen of the application of glass for the latter purpose has ever appeared among the Egyptian curiosities brought to this country.

That the Hebrews, from their long residence in the land of their captivity, should have become acquainted with the art of making glass, is extremely probable, but whether it was used by them for mirrors is not known. That glass was known to the inhabitants of Alexandria is undoubtedly true, and various specimens of coloured-glass vases, recovered from the buried cities of Pompeii and Herculaneum, are sufficient evidences of their inhabitants having attained a high degree of excellence in the art. No doubt appears to exist of the fact of glass having been used for glazing the windows of the wealthy in Pompeii and Rome. St. Jerome tells us that in his time (A.D. 422) windows were formed of glass; and about a century later, it appears, from the evidence of Paulus Silentarius, that the windows of the church of St. Sophia, in Constantinople, were glazed with glass.

Frequent mention of glass as a domestic and ornamental appliance appears in the works of the writers of this time; and we may justly infer that considerable skill was shown by the Roman and Grecian artists of the period. It is said that Nero gave 6,000 sestertia—a sum equal to £50,000 sterling—for two cups with handles, made of a superior kind of transparent glass; and Pliny tells us that vessels of crystal were so highly valued in his time as to have almost superseded the use of gold and silver for such articles in the houses of the wealthy. It is generally believed, however, that the introduction of lead into white glass is of British origin, none of the specimens of Roman [illegible]facture in the British Museum, or elsewhere, possessing any traces of that metal, though coloured and enamelled glass in cups and vases appears to have been by no means scarce.

Of the art among the Venetians, abundant evidences remain; and for many years the supremacy of the glass-makers of that city was acknowledged in all the civilized world. The Venetian ball, long a puzzle to Englishmen, remains to tell of their ingenuity; and in Venice, to be a glass-maker, was to be a gentleman, *gratis*, for the art's sake. In the scale of early European glass-makers, the Bohemians rank next to the Venetians, whose productions they imitated with great success. Thus ornamental glass-ware—more especially those long drinking-cups, into the stems of which were enclosed twisted enamel tubes—has long been celebrated. Many specimens of this kind of work appeared in the late Exhibition. In the present day, Venice manufactures most of the glass beads and bugles for the African market; and the various glass-works in Bohemia afford employment to upwards of [illegible] persons. It is consolatory to think that in our day there is little necessity for the Venetian drinking-vessels, which are said to have discovered the presence of poison by instantly breaking into pieces—a poetical conception, referable, probably, to the lightness of the material, which caused it sometimes to break in the hands of the nervous poisoner.

Among the Chinese, the art of glass-making has been known for centuries. They excelled in the art of imitating gems; and it is said that it was scarcely possible to distinguish the real from counterfeit stones, so exquisitely were the latter prepared. To the Arabians—that singular and little appreciated people, who were once the carriers of the world—our ancestors are indebted for much of the knowledge they possessed of China; and it is curious that the art of glass-making is in much the same state in that vast empire in the nineteenth century, as it was when the Arabs first brought it into Europe. In the form of vases and false gems, rather than useful articles for domestic purposes, Chinese glass almost invariably appears.

According to Pennant, the art of making glass was known in Great Britain before the Norman Conquest; and certainly the secret of making glass-beads, amulets, and "snake stones,"—a kind of glass ring of various colours—was known to the Druids and Anglo-Saxons. Fragments of Roman glass have been frequently found in various parts of the country; and in 1847 there were discovered, in digging for the foundation of the episcopal palace of the Bishop of Oxford at Cuddesdon, a pair of glass vases of a pale blue colour, and ornamented with waved lines, which are said to belong to the Saxon period, and of as early a date as the sixth or seventh century; though it was not till the middle of the seventeenth century that glass windows began to be common in England.

We have thus briefly traced the history of glass manufacture in Europe. From the Phenicians—said to be the original discoverers—the art passed to the Crusaders, who transferred their knowledge to the Venetians in the thirteenth century, by whom it was for many years kept a profound secret. In the middle of the seventeenth century, the great Colbert introduced the blown glass mirror manufacture into France. As early as 1557 the manufacture of window glass was begun in Crutched Friars, London, and various articles in flint glass were soon afterwards made in the Savoy-house, in the Strand. In 1635 the art was greatly improved by the use of coal instead of wood in the furnaces; and in 1673 the first sheets of blown glass for mirrors and coach windows were made at Lambeth, by some Venetian artists introduced by the Duke of Buckingham. What must have been the state of society in Europe two hundred years ago, when glass windows and mirrors, carpets, gloves, and stockings, were known only to the very richest of the people?

The question now arises—which, perhaps, should have been asked before—

WHAT IS GLASS?

Glass—in French, *verre*—is a transparent, homogeneous, solid body, formed by the fusion of silicious (flint-like) and alkaline (fixed salt) substances. Glass is solid at ordinary temperatures, brilliant, always more or less transparent, and invariably brittle. "Many opaque substances are capable of assuming a form more or less vitreous, or glass-like—such as earths, some acids and salts, and metallic oxides (rusts). In porcelain we see a partial vitrification, for the granular texture is exceedingly fine, and a slight transparency is produced; but complete vitrification never results until after the fusion or melting of the ingredients; and we know of no means by which porcelain clay, or any other earth, in its simple state, may be melted. But when two kinds of earths are mixed together—or when a silicious earth is mixed with certain crystalline salts—perfect fusion may be produced, and a nearer approach to transparent glass be the result. Again, certain metallic oxides may be made to assume a vitreous form, and, when mixed with silex, to produce a glass possessing valuable properties. We may hence regard glass as resulting from the mixture or fusion of these three kinds of ingredients; and the purpose fulfilled by each may be thus understood:—the silicious substance is the [illegible] ingredient—the salt or alkali is the flux, by mixture with which the sand becomes fusible—and the metallic oxide, [illegible] whereby one kind of glass is distinguished from another.

There are [illegible] kinds of glass known as crown, plate, common bottle, and flint glass, the basis of all of which is sand, [illegible] solvent [illegible]. The sand of the river [illegible] many ages [illegible] glass-making, and was consequently sought after and [illegible] countries; but at the present time, the sea-sand from Alum Bay, Isle of Wight, and from the shore of Lynn, in Norfolk, with some found in Australia, are considered most fitted for the glass-maker's purpose. Flint glass, so called from calcined flints having formerly been used as the silicious material, is composed, according to the formula of Mr. Pellatt, of

Carbonate of Potash, 1 cwt.
Red Lead or Litharge, 2 cwt.
Sand washed and burnt, 3 cwt.
Saltpetre, 14 to 28 lbs.
Oxide of Manganese, 4 to 12 oz.

The more common or ordinary kinds of glass have little or no lead in their composition; and in the suitable quantities of the ingredients considerable difference exists among glass-makers.

The reader having gone thus far with us, we request the honour of his company to a visit to the flint glass factory of Messrs. Apsley Pellatt and Co., Holland-street, Blackfriars, London, where we shall endeavour to explain to him

THE METHOD OF MANUFACTURING FLINT GLASS.

Premising that our reader has never before had the honour of visiting a glass-house, it will be as well to conduct him through the various departments of these extensive premises—not in the order in which he would be most likely to see them, but in the routine actually observed in making glass.

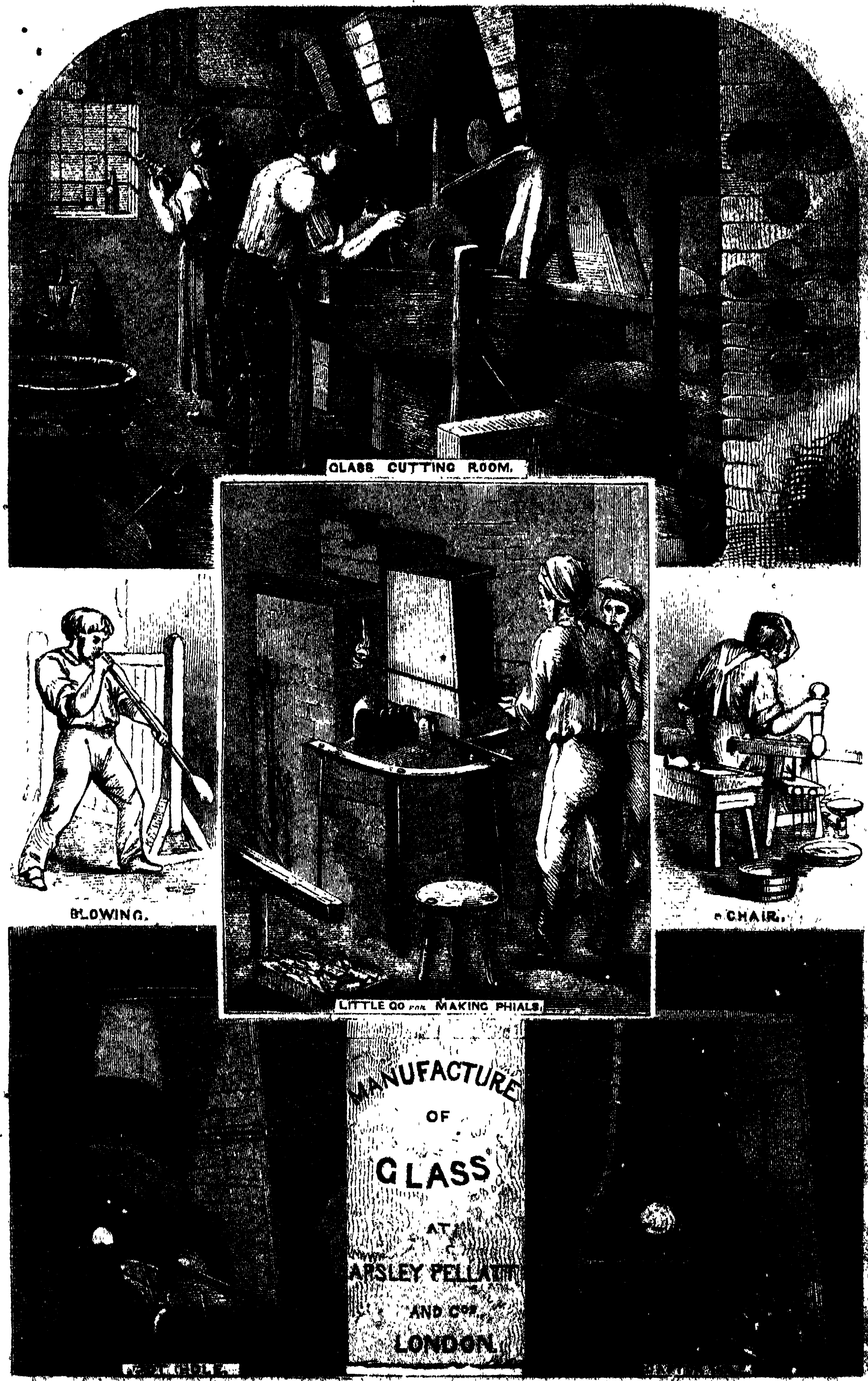
The factory is situated in Holland-street, so called from a woman of by no means the best character, who, in the reign of Charles the First, inhabited the old moated manor-house of Paris Garden, afterwards known as "Holland's Leaguer." It is not the cleanest neighbourhood in the world, but we must not mind that; it is the glass-house we want, not the street; and if we wish for information, we must not travel in shiny boots and white kid gloves. The glass factory, then, of Messrs. Pellatt comprises several buildings necessary to the art, and occupies about three-quarters of an acre. The various buildings consist of a receiving-house, where are stored the sand, cullet (broken glass), &c.; a horse-mill for grinding old melting-pots as one of the ingredients for making new ones; an apartment where the clay, ground or powdered, is kneaded and mixed for the making of the pots; another, where the pots are made; others for drying the pots when made; rooms for storing, washing, and preparing the sand and alkaline salts; a mixing-room, in which the various materials are weighed and combined; two coking ovens, or furnaces, for converting coal into coke; the glass-house, to which all these are subsidiary; the glass-cutting and engraving rooms; show rooms, warehouses, counting-houses, &c. Before the excise regulations were abolished, various vexatious rules had to be observed rooms were locked up, of which the excise officer kept the keys, and so forth; but such is the force of habit, that much the same routine is followed now that the glass manufacturer is free to pursue his trade in his own way.

The pots in which the glass is fused are made of the finest Stourbridge clay, to which a certain proportion of old pots ground fine may be added Great care is necessary in the making, drying, and baking of these pots, as upon their trustworthiness in the furnace depends greatly the success of the after process of glass-making. The pot, when filled, contains about 16 cwt. of fused glass—called metal, in the technical language of the workmen. Each pot weighs about a thousand pounds, though its height is not above three feet, by two-and-a-half feet in diameter. In shape it is cylindrical, with a round top and a flat base, having an opening near the top—in fact, it resembles, more nearly than anything else, those earthen vessels which the pigeon-fanciers fix against the walls of their houses as nests for the birds. The pots, when made, are allowed to remain for several months before they are baked, so as to become dry in a short space of time. When completely annealed, they are placed as soon as possible in their place in the fire. This is a very dangerous service, especially if conducted without proper mechanical aids. They who assist are exposed for a considerable time to the whole force of the furnace heat, and it is frightful to witness the sufferings of the workmen exposed to the radiation of the flames. Either in removing a broken pot, or in setting a new one, the whole breast of the fire must be exposed. Dr. Irvine is said to have caught his last illness while imprudently assisting in this formidable operation.

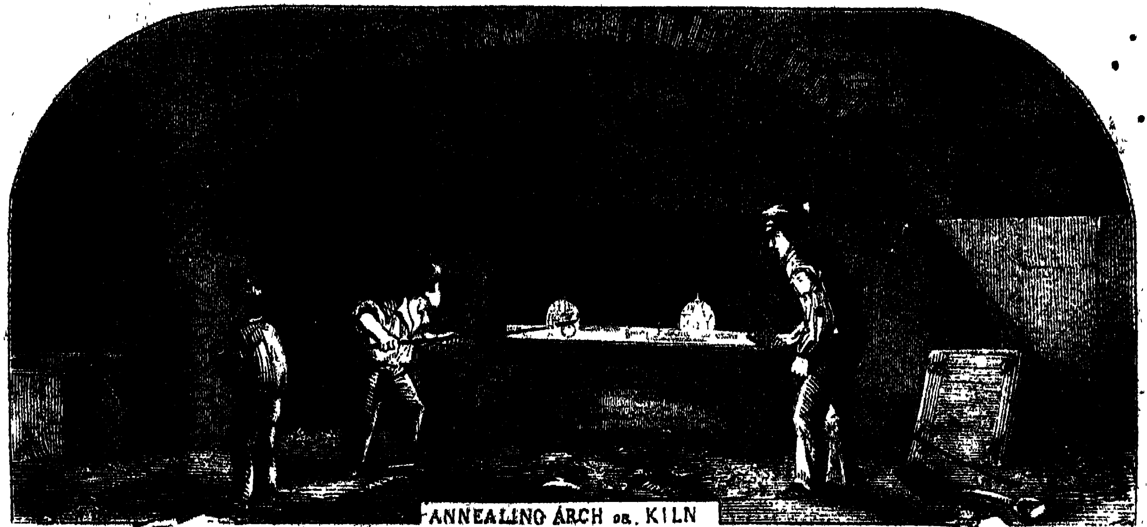
We now enter

THE [illegible]

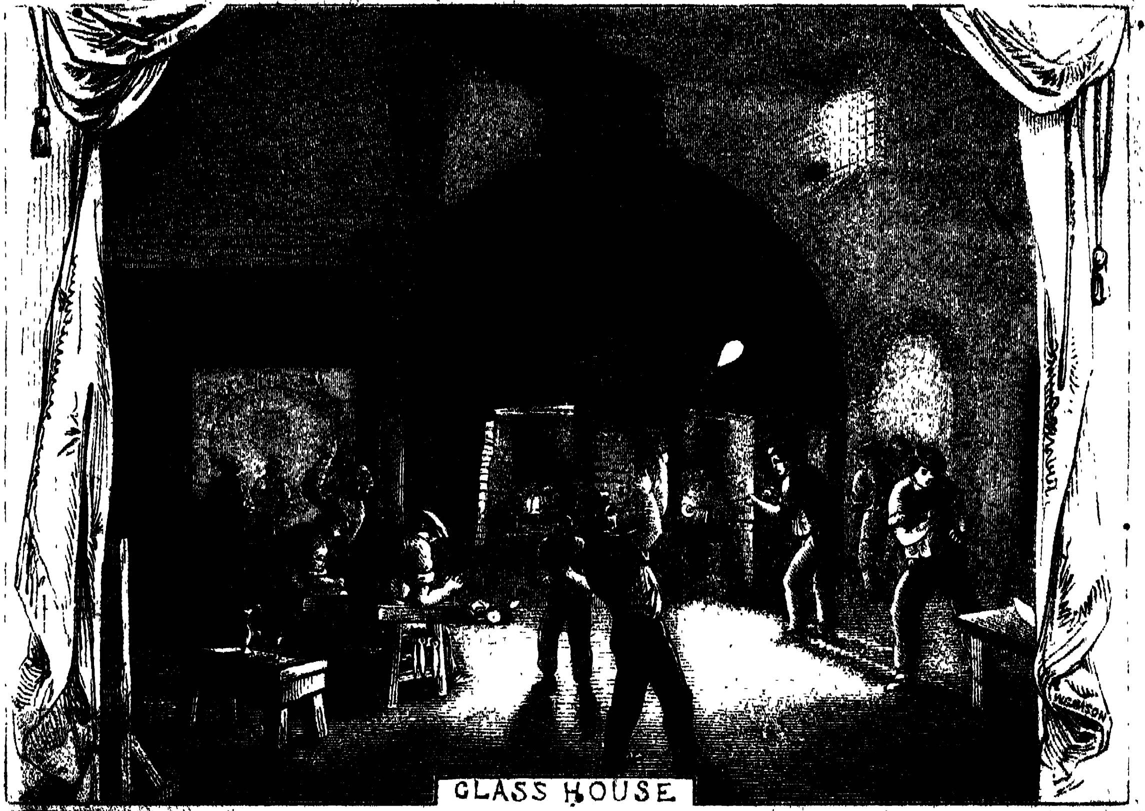
where the actual process of glass-making is being carried on. It is almost impossible to describe one's sensations on entering this building for the first time. In the ordinary way, the visitor is



DRAWN BY W. H. PRIOR. J. COWLAND, SC.



ANNEALING ARCH OR KILN



GLASS HOUSE

[illegible] ETCHING-ROOM.

generally shown the glass-house first. He is lost in wonder. He gazes around him upon the dingy walls, in the centre of which is the melting furnace, the chimney of which rises through the iron roof. He cannot reconcile the dimness of the place with the bright glow from the pot-arches, or the dull radiance proceeding from the annealing arch. He feels some little alarm as he sees dusky figures close beside him swinging about great masses of what appears to be red-hot iron. He feels, as he looks upon the vivid light from the opening furnace, as if a hot mask were placed upon his face, and he unconsciously puts his hand up to his brow. A warm perspiration envelopes him, and it is some minutes ere he can recover from his first emotions on witnessing the strange unearthly scene before him. Dark figures flit past him, each bearing a mass of living fire, and he almost regrets his temerity in venturing into the horrid place. But soon this impression wears off; and, at the voice of his conductor, he gazes with wonder and admiration at the operations of one particular set of workmen. But first let us describe briefly the nature of the furnace, the light and heat of which glares brightly on him from a dozen openings. There are two furnaces in this glass-house, but a description of one will suffice.

The furnace, then—the general form of which will be best seen in the engraving—consists of a circular dome, about fifteen feet in diameter and eighteen in height; the internal construction of which may be understood, if we suppose two basins inverted, a deeper one at the top. In the inner and shallower basin are contained the pots and the fuel of the fire. At various parts of the outer wall holes are left, to enable the workmen to get at the pots of glass; and the whole interior of the furnace is lined with fire-proof bricks. The fuel is laid on an iron grating in the centre, in connexion with which, and beneath the glass-house itself, are a series of passages, the purpose of which is to create a very powerful draught, which, passing upwards into the fire, keeps the fuel in an intensely white heat. A flint-glass furnace is so constructed that no heat or flame is allowed to escape from the chimney; and the draught must never be too strong to prevent a pressure of short and vivid flames from the "bye-holes" of the furnace, on each side the pot-mouths. The heat is reverberatory; that is, the heated air and flame is made to return from the roof to the pots, and thus a very high temperature is kept up within the interior. The furnace before us consists of nine large pots and three smaller ones, this size being considered the most economical in point of consumption and working power. The fuel employed is coke, made on the premises; and about 21 tons of coal are consumed weekly.

It sometimes happens that accidents occur to the furnace. The "siege," or bottom of the furnace, wants repairing—part of the crown of the arch breaks in—or an old pot breaks, becoming vitrified by the heat, and sticks to the bottom of the furnace. In these cases, a new pot must be introduced, the arch must be repaired, or the siege made strong again, without greatly hindering the progress of the work. Once lit, the furnace-fire of a glass-house is never extinguished. The withdrawal of an old pot, and the introduction of a new one, technically called "setting a pot," is a most fearful operation. The old pot has to be dug out of the furnace in the face of the raging flames, for which purpose the temporary brickwork in front of the arch is pulled down. About six or eight men, each with a bar in his hand about five feet long, like a javelin, steeled and sharpened at the end, rush forward in face of the fiery furnace, guarding their faces with their protected arms, and aim a blow at such of the irregular rocky incrustations of clay as adhere to the siege. This operation is repeated until the whole of the vitrified clay is removed from where the old pot stood. The spot is then repaired with clay and sand, and the new pot, at a white heat, is removed from the annealing pot-arch, and carried upon the end of a two-wheeled iron-carriage by several workmen, who carefully set or tilt it backwards into its proper position in the furnace. The opening is then bricked up as before, leaving only a small hole for the introduction of the gathering-iron. The fatigue and exhaustion of the men engaged in this arduous task may be well imagined, when it is considered that the furnace is kept to a sufficient heat to prevent the other pots in the furnace from cooling in the slightest degree; and that the operation sometimes occupies several hours. The melting-pots seldom last above three or four months, though it is not uncommon to patch up a broken one, which will wear for several weeks. This patching is performed by means of exposing the pot to the air, when the glass, leaking out, becomes hardened sufficiently for use. The pot is so placed in the furnace that every part of it, except the mouth, is exposed to the flames. If you look into the mouth of the pot, you see before you a mass of fiery whiteness; and you draw back from the heat which the glass-maker faces day and night. This is the glass, or "metal," in a state of fusion.

Let us now examine the way in which

THE MANAGEMENT OF A GLASS-HOUSE

is carried on in respect to *time*. It is rather curious. The filling and working out of the melting-pots generally takes about a week. On Friday morning the mixed materials are brought to the furnace in wooden barrows, and there thrown into the pots, which hold about eighteen cwt. each. About four cwt. is thrown in at once; and, after allowing sufficient time for the melting down of the various charges, the process is repeated, till each pot is filled with fused metal. The complete filling of the pots occupies about fourteen or fifteen hours; but the metal does not free itself from air-bubbles and striæ in less than from fifty to sixty hours. When all the pots are filled, the mouth of each is securely clayed up, and the "founding" commences. For this purpose the fire is urged up to the greatest intensity during Saturday and Sunday—for the exigencies of the glass-maker's trade allow of no rest or stoppage; though it must be admitted that the work is so admirably apportioned as to leave nothing to be done on the Sabbath, but to watch the furnace, a service not requiring many hands. During the progress of the founding or melting, the metal is tested by withdrawing a small quantity now and then with an iron rod. This is called "taking a proof" of the metal. But, beyond this, there are certain infallible signs by which the *teaser*, attendant, or stoker, may tell whether the metal is in a fit state for working; such as the whiteness of the flame exuding from the furnace on each side the pot, &c. In some glass-houses a vast quantity of scum rises to the top of the metal; but in the making of flint-glass, such is the purity of the materials used—little else but "virgin glass" being made—that very little waste accrues. The shorter the time of fusion the better; and the heat during the process of founding can scarcely be too great. Driven snow is not whiter than the burning coal in the centre of the furnace when it has reached its maximum of intensity. If the glass do not get sufficiently fine during the time allotted, or if it should become "coddled" or "gelatinous," it never will be fit for the finer work; and all that can then be done with it, is to ladle it into water, and make it into "cullet," for re-fusion with fresh materials.

We will suppose, however, that no accident of this kind has happened—and such accidents are of rare occurrence—and that we are standing in the glass-house on Monday morning, when the "blowing process" commences. To render what follows more explicit, it will be necessary to describe the tools required. First, then, is the glass-maker's chair, a "flat seat of timber about ten inches wide, each end being fixed to a frame connected with four legs and two arms, the latter on an incline." On the arms of the chair is fixed an edging of wrought iron, for rolling the blowpipe backwards and forwards with the fused glass on the end of it, thus causing the rotatory motion of a pole lathe; while the right hand with the pucellas gives the requisite form. The "marver" (a corruption of the French *marbre*, marble having been formerly employed) is a cast-iron slab with a polished face, placed on a wooden stand. Upon this slab the lump of glass is rolled to give it a regular outer surface, so that the result of blowing may be uniform in thickness of metal. The "pucellas" is somewhat like a pair of spring sugar-tongs, the prongs resembling the cutting parts of shears, but which are blunt instead of sharp. The pucellas is used for rubbing the outside of solid or hollow glass, and pressing it into a diminished diameter, at the same time elongating the parts by the chair-rotating process. This tool does a similar duty as the cutting-tool of a lathe, but instead of removing the chips, it simultaneously squeezes and lengthens. This tool is used in opening and widening the mouths of glasses, bowls, vases, &c. The "tongs" are used for laying hold of half-formed handles, &c., and generally to seize the glass in the process of making. The shears are merely ordinary scissors, and are used for clipping off the surplus metal from wine-glasses, handles, &c. The battledore, which is a square piece of wood on a [illegible] handle, is used to flatten the bottom of the vessel to be made. These, with the "pontil" and blowing-iron, are the principal tools used by the glass-makers. The "ponty," or "pontil," is a solid rod of iron, used to support the glass while working, when the blowing-iron is no longer wanted. The blowing-iron is simply a tube, the size of which varies with the kind of work required.

(*To be concluded in our next number.*)

EXHIBITION OF THE INDUSTRY OF ALL NATIONS;

ABOUT TO BE HELD IN NEW YORK.

THIS EXHIBITION, which it is proposed shall take place in New York early in the ensuing summer, having excited a deep and lively interest, not only in America, but in this country, we have much pleasure in presenting our readers with two views of the building in which the Exhibition is to take place. This we are enabled to do through the kindness of the Commissioner, CHARLES BUSCHEN, Esq. Our engravings are from the original designs of Sir JOSEPH PAXTON, a gentleman whose name is so intimately associated with the building in Hyde-park, which remains a gigantic monument of his enterprise and genius. The designs were presented by Sir Joseph, in the most handsome manner, to the managers of the New York Exhibition.

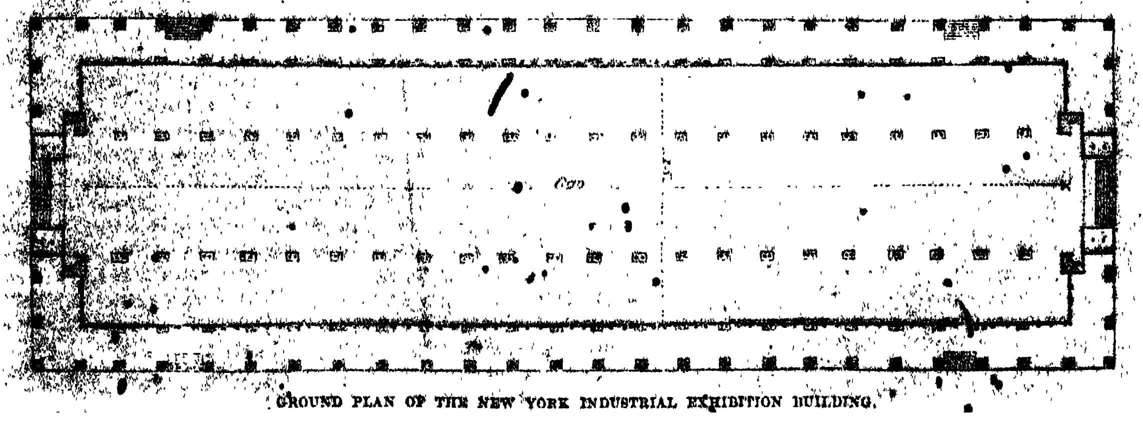
The form of the building is an oblong square, about 600 feet in length by 150 feet in width. It is to occupy an area of about one-third that of the Crystal Palace. Though presenting many features in common with the design already executed here, it possesses several original beauties. The materials proposed to be used in its construction are, for the most part, similar to those employed in the Great Exhibition, the difference being that *glass* is used to a much less extent, and the introduction of slates in the main roofs, for the purpose of providing against any superincumbent weight of snow, likely to occur in the more inclement seasons of the latitudes of America. The *exterior* is highly ornamental, having four towers, one at each angle, to contain the staircases leading to the galleries. The building is flanked by a raised terrace, approached by flights of steps, and returning at the ends by stone piers, surmounted by lights. The *tout-ensemble* of the exterior is light, elegant, and in good taste.

We are much pleased with the design for the *interior*, which is in every way tasteful and appropriate, but with a due regard to substantial construction. The compartments form a centre, and two side avenues. The main roof is carried by admirably-proportioned segment arches, springing from coupled columns, and rising to the underside of the tie-beams, the interior space forming elegant and appropriate spandrils. The side roofs are carried in a similar way, the arches springing from imposts inserted in the outer wall, a few feet from the ground. The outer and side roofs are further strengthened by strong purlins running the whole length of the building. The ends are lighted from fan-shaped windows, forming panels with circular heads, and richly-ornamented. Under these windows are the principal entrances. The upper roof *alone* is glazed, and partakes strictly of the character of the lower ones. Not the least beauty of the construction is the manner in which the side galleries are kept up, so as not to intercept in any way the admirable perspective of this beautiful composition. The estimated *cost* of the building is £20,000—a small sum in comparison to its extent, importance, and capabilities of accommodation.

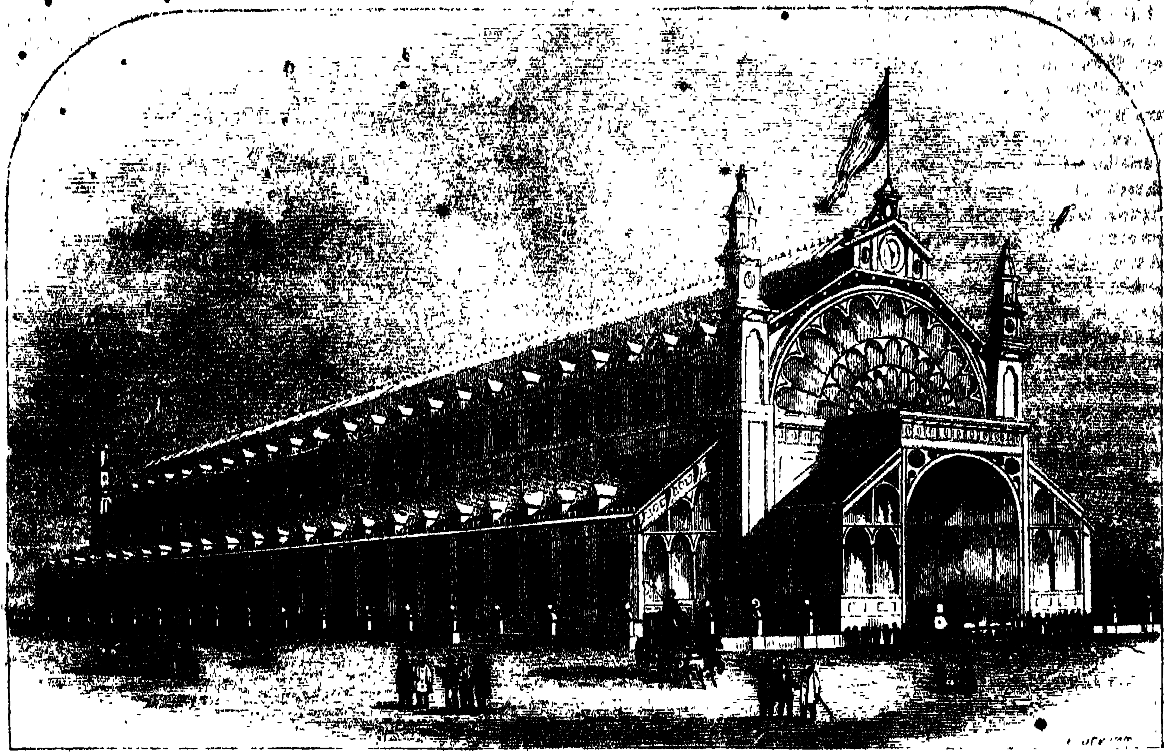
While the contemplation of these elegant designs will, we doubt not, produce feelings of admiration in all who behold them; the projected Exhibition, with its numerous associations, will tend to increase the good understanding which subsists between England and America. Hitherto, some feelings of discord have marred the harmony which ought to subsist between the great families of the Anglo-Saxon race. Their interests are one—their aims should be one. Both rejoice in a common civilisation and Christianity, and tongue. Last year, America came to our World's Fair, and took no mean place in that illustrious show, and now America invites the world to her shores, that it may better do homage to American enterprise and art. Great, we trust, will be the gathering. More even than ourselves the Americans are sons of labour—more than ourselves, therefore, can they recognise its dignity and blessedness, and worth. There, even more than here, the festival in honour of labour should be held. There, more than here, even, is the spirit of the age paramount. America has no dark past of iron tyranny to look at and to blush for. America has little to unlearn. In Europe we have worshipped the hero who has deluged the land with blood; the priest who, armed with the terrors of the next world, has secured to himself so much of the good things of this. It is only lately that, in Europe, we have learned to honour the people by whom all that is great in the world's history has been achieved—who have bridged over oceans—who have removed mountains—who have planted deserts with busy life—whose works of art, lasting as the sun's glad light, or the air's balmy breath, proclaim what man, in his might and majesty, can do. In America it is otherwise.

We English must rejoice that America has imitated us. *Our* Exhibition passed off gloriously. We trust and believe that *theirs* will pass off equally as well.

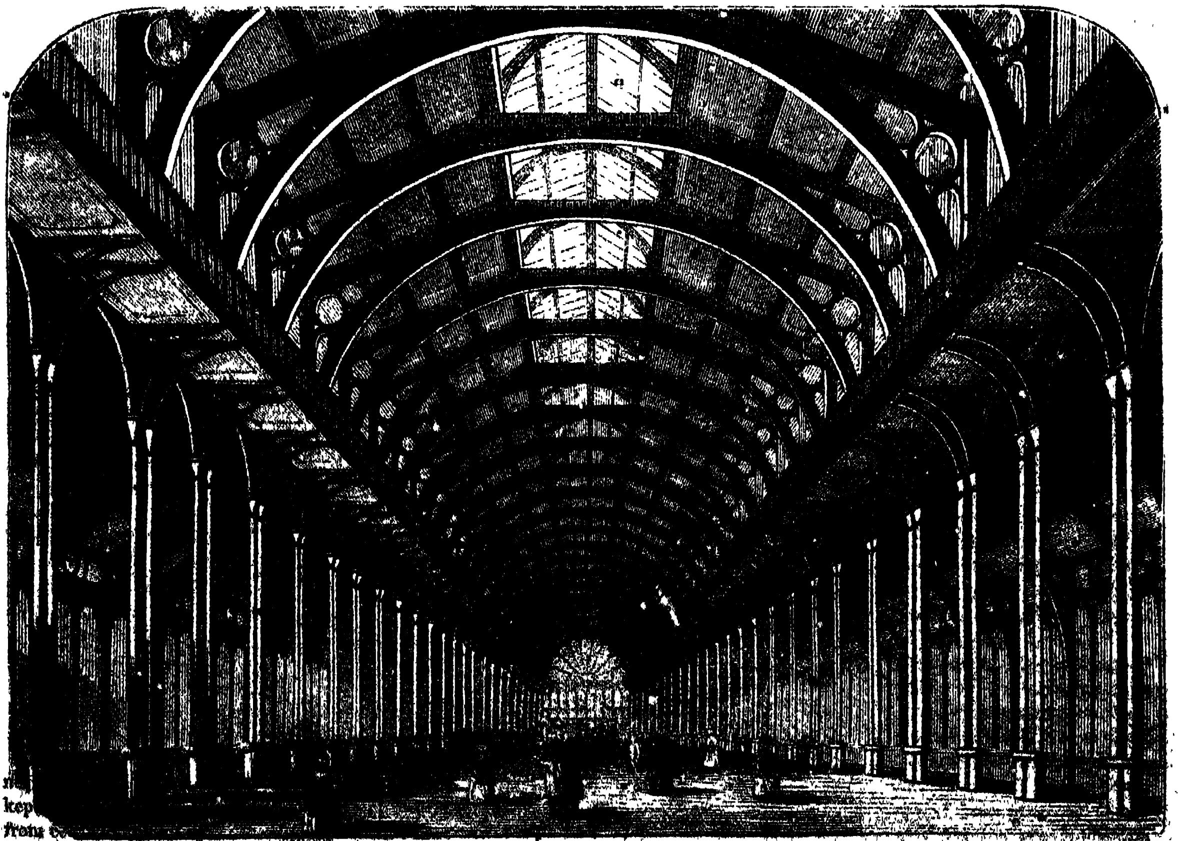
As regards America itself, it is clear, in the knowledge it will disseminate, in the impulse it will give to the industrial arts, such an Exhibition as that proposed will be useful in the extreme. Nor will labour selfishly triumph alone. Peace and human brotherhood, and the soft humanities of life, will share in the honours of the day. Rightly did Milton sing, in immortal verse, of "the arts that humanise and bless mankind." The Exhibition will be a temple consecrated to Peace. As the men of one nation gaze upon the productions of another, they will learn that God has made of one blood all nations that dwell upon the face of the earth, and that, to encourage jealousy or revenge—to fan the flame of mutual hate—to let loose the hell-hounds of war—is forbidden by the common origin we all admit, and the common destiny we all obey. Our common brotherhood will again be owned and felt, and thus once more will be placed palpably before the world a type of that coming time which poetry has sung and prophecy foretold; when the lion shall lie down with the lamb—when war shall be banished back to its native hell—when earth shall bask once more in the sunshine of universal peace.



GROUND PLAN OF THE NEW YORK INDUSTRIAL EXHIBITION BUILDING.



THE GREAT INDUSTRIAL EXHIBITION BUILDING, NEW YORK.—DESIGNED BY SIR JOSEPH PAXTON.



INTERIOR OF THE BUILDING.

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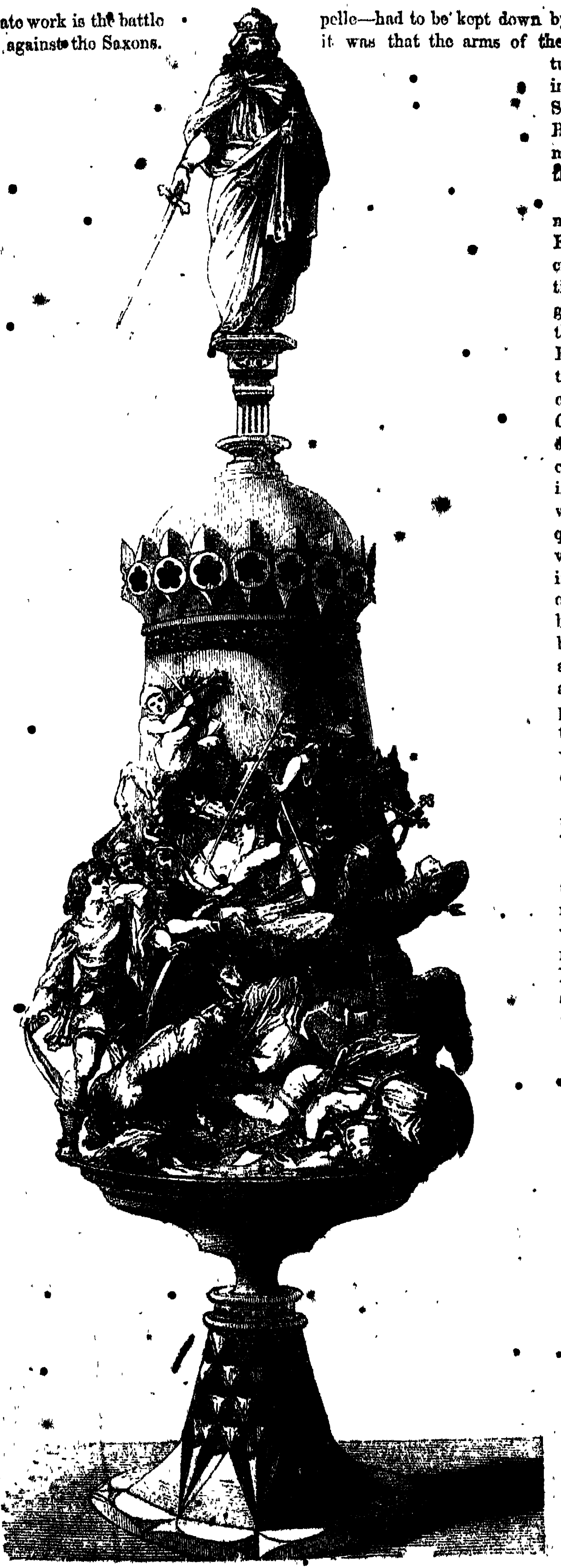
IVORY VASE, BY M. LOUIS LAUTZ.



IVORY VASE.

The subject represented in this delicate work is the battle of the Franks, under Charlemagne, against the Saxons. It is taken from the picture by Offenbach—a veritable battle of the giants! In style and manner of composition it is alike remarkable. The varieties of expression, the details of costume in the figures, are given with great precision. The horses, maddened with the fire of opposition, have character and force in every muscle; and the whole composition is grand and life-like. Every figure is remarkable for grace and vigour, and the entire work may be said to be distinguished for fertility of invention, elegance of design, and delicacy of taste. It was exhibited at the Crystal Palace, and was admired by thousands.

The name of Charlemagne is to the French what that of his great contemporary, Alfred, is to us—a name to be honoured through all time. Before his advent, the Franks were a restless, ambitious, war-loving people, and nothing more. He it was who spread among them a love for the arts of civilised life; he curbed the rude, repelled the invader, encouraged the timid, and protected the weak. Succeeding to a crown and kingdom already famous by the intrigues and battles of Pepin and Clovis, the first efforts of Charles the Great were directed to the subjugation of the numerous hordes which surrounded him. For ages, barbarism had been preying on the vitals of civilisation—conquering, destroying, or blending with it. The amalgamation was not yet complete—the contest was not yet over—the victory of order over disorder was not yet accomplished; and thus it was that the fierce Austrasians of the Rhine must be restrained in their attacks on the more gentle Neustrians on the banks of the Seine. Thus it was that the Aquitanians, subdued by Clovis, and again risen in the might of wild, unregulated warfare, had to be kept within the bounds set apart for them. Thus it was that the Saxons—a formidable and warlike people, whose dominions bordered his own, and whose stronghold was not far from his chosen city of Aix-la-Chapelle—had to be kept down by the force of arms. Thus it was that the arms of the Franks were successfully turned against the Lombards, in Italy; the Arabs and the Saracens, in Spain; and the Basques and Gascons, who made common cause with their conquerors.

Before the time of Charlemagne (A.D. 752—814), the Franks disliked dwelling in cities, and despised fortifications. They were of no religion, and considered war as the end and aim of their lives. But the efforts and example of this great monarch advanced civilisation and promoted Christianity within his kingdom; and his reign may be considered as the great epoch in European civilisation from which may be dated all subsequent improvements. Chivalry and virtue—and not incompatibly—in this reign often centred in the same bosoms. It was then that a brighter charm was thrown around the domestic hearth, and a higher standard of public morality was recognised than had ever before been witnessed. He also greatly encouraged commerce.

The particular action, in the thirty years' war waged by Charlemagne with the Saxons, which is here illustrated by the artist, is not recorded. Indeed, so frequent were the battles, and so obstinate was the resistance, of the Pagan enemies of France, and so like was one engagement to another in its conduct and results—fierce assault and obstinate encounter, followed by treaties neither party meant to keep, and the failure of which only led to renewed strife—that it would be difficult to single out any one battle from among the number, so distinguished was every one for feats of personal prowess and gallantry. And thus victory and defeat alternated, till, in the year 800, the Saxons were finally subdued by the arms of Charlemagne.

This latter year was distinguished by an eventful ceremony, which, though but a ceremony, had more influence on European policy than all the wars and all the victories of the preceding century. A fierce rebellion broke out in Rome, in the course of which Pope Leo III. was taken prisoner, maltreated, and closely confined in a fortress; but he contrived to escape, and fled for protection to Charlemagne. With his wonted pity for the unfortunate, the monarch received the fugitive, and, leading him back at the head of a large army, reinstated him in the pontifical chair. On the following Christmas-day Charlemagne, with his whole court and an immense retinue—consisting of the flower of the French nation—attended mass in the Cathedral of St. Peter's. At the conclusion of the imposing ceremony the Pope advanced in procession to where the monarch stood, and, placing on his head a crown of gold, saluted him as Emperor and Augustus. Thus was the empire of the West restored in the person of Charlemagne. The Frank sat on the throne of the Cæsars. Nor was the ceremony to be considered a piece of mere idle pomp. It gave rights, and dignity, and power; and the magic of a name, the influence and authority of which is recognised even now, was spread abroad through all the world.

It would be idle to eulogise a man like Charles the Great. He was fitted for the times in which he lived. He possessed, in his own person, the characteristics of a hero and a statesman. Three hundred years had yet to pass ere chivalry was to shine out like a star on the western world; and yet Charles anticipated its spirit, and infused, in the heart of his people, a love of virtue and a high sense of honour. He was a patron of literature and the polite arts when the taste for both seemed to have been utterly lost; and in his reign society in France first assumed a state of real freedom. Hitherto but two classes had existed, the aristocracy and the serf; henceforth a third appeared, in which the wealth of the first and the sinews of the last were united. Full of years and honour, Charlemagne died in the year 814, and was buried in the famous cathedral he had founded at Aix-la-Chapelle.

This hasty sketch will sufficiently explain the enthusiasm with which the name of this great monarch is ever mentioned to the French. Poets, painters, and artists of all after time have only been too proud to record the events which distinguished this remarkable age.

THE LADIES' DEPARTMENT.

LONG PURSE (IN CROCHET).

Materials.—6 skeins of garnet-coloured purse-silk of the finest size; 4 skeins of white ditto; of beads, the following kinds, which must all be of the size usually called *seed-beads:* gold, silver, steel, burnt steel, garnet, and clear white. The gold and silver beads must be round ones, not the cut kind commonly bought. For the garniture, two fringe ends, combining burnt and common steel and gold, with rings of gold and steel. Crochet hook, Nos. 23 and 21; or those who crochet very loosely should use 24 and 22.

Purses in which the pattern is formed of beads of any one kind on a silk ground in crochet and knitting, have long been common in England; but until the Exhibition none had been seen in which various sorts of beads were intermingled to form the design. The specimens of this sort of work in the foreign departments of the Crystal Palace were, however, so beautiful as to attract great attention and admiration; and we trust we are at once gratifying our fair readers, and fulfilling the promises made to them last year, by giving them instructions for manufacturing these requisite and costly articles. The process is by no means difficult, requiring only attention to the directions; and the expense of the materials is inconsiderable; the manufacture may therefore be made a source of considerable profit.

In selecting the materials, great care should be taken that the beads are all of the same size, otherwise the work will be spoiled. The rings should be as large as they can be procured. The beads must first be strung on the two kinds of silk; all the gold and some steel on the garnet silk, and the remainder on the white. Put them on in the following order:

Garnet silk. 32 gold, 5 steel, 8 g., 5 s., 9 g., 6 s., 10 g., 6 s., 7 g., 2 s., 4 g., 2 s., 4 g., 2 s., 4 g., 2 s., 4 g., 4 s., 4 g., 4 s., 1 g., 1 s., 4 g., 1 s., 11 g., 2 s., 18 g., 2 s., 13 g., 1 s., 8 g., 1 s., 367 g., 1 s., 8 g., 1 s., 8 g., 4 s., 8 g., 4 s., 6 g., 3 s., 4 g., 3 s., × 4 g., 2 s., × six times, 11 g., 2 s., 18 g., 2 s., 14 g., 4 s., 10 g., 4 s., 7 g., 2 s., 4 g., 2 s., 6 g., 6 s., 8 g., 6 s., 4 g., about 103 steel.

This quantity of beads will be required for one end; they should, therefore, be distributed on two skeins of the silk. The best way is to thread on one skein all up to the 367 gold, and about 150 of them; use this silk up, and then, if a few more are required, you can easily add them. If there be too many, they can be strung on the next skein. The other end will be done in the same way.

On the white silk thread the silver, blue steel, common steel, white and garnet beads, in the following order, the quantity given being for one end, for which about two skeins of silk will be required, which must be arranged like the garnet.

The colours will be indicated by their initial letters:—s., silver; st., steel; b.s., blue steel; w., white; ga., garnet.

234 w., 1 st., 5 w., 1 b.s., 6 w., 1 b.s., 5 w., 1 st., 4 w., 1 st. 5 w., 1 b.s., 6 w., 1 b.s., 5 w., 1 st., × 4 w., 2 st., 4 w., 2 b.s., 2 w., 2 b.s., 4 w., 2 st., × twice, 2 w.

This suffices up to the second round of blue steel. We will now give them in their successive rows; to prevent confusion observing that as every row is but one side of the end, it must be *repeated* in threading the beads, as will be seen by the marks.

3rd Row × 5 w., 3 st., 2 wh., 3 b.s., 12 w., 3 b.s., 2 w., 3 st., 5 w. × twice.

4th × 8 w., 4 st., 5 b.s., 12 w., 5 b.s., 4 st., 8 w. × twice.

5th × 9 w., 2 st., 6 b.s., 3 w., 1 st., 6 w., 1 st., 3 w., 6 b.s., 2 st., 9 w. × twice.

6th × 9 w., 1 st., 5 b.s., 3 w., 3 st., 6 w., 3 st., 3 w., 5 b.s., 1 st., 9 w. × twice.

7th: × 5 w., 1 b.s., 4 w., 5 b.s., 6 st., 6 w., 6 st., 5 b.s., 4 w., 1 b.s., 5 w. × twice.

8th × 5 w., 8 b.s., 2 ga., 5 st., 6 w., 5 st., 2 ga., 8 b.s., 5 w., × twice.

9th × 4 w., 7 b.s., 4 ga., 4 st., 4 w., 4 st., 4 ga., 7 b.s., 4 w. × twice.

10th × 3 w., 6 b.s., 4 ga., 3 st., 4 w., 3 st., 4 ga., 6 b.s., 3 w. × twice.

11th × 4 w., 4 b.s., 1 st., 5 ga., 1 st., 6 w., 1 st., 5 ga., 1 st., 4 b.s., 4 w.

12th × 6 w., 3 st., 4 ga., 1 st., 1 s., 6 w., 1 s., 1 st., 4 ga., 3 st., 6 w. × twice.

13th × 6 w., 5 st. 4 ga., 3 s., 6 w., 3 s., 4 ga., 5 st., 6 w. × twice.

14th. × 3 w., 6 st., 1 w., 2 st., 5 ga., 2 s., 8 w., 2 s., 5 ga., 2 st., 1 w., 6 st., 3 w. × twice.

15th: × 4 w., 4 s., 2 w., 3 s., 4 ga., 3 s., 8 w., 3 s., 4 ga., 3 s., 2 w., 4 s., 4 w. × twice.

16th: × 9 w., 4 s., 4 ga., 5 s., 4 w., 5 s., 4 ga., 4 s., 9 w. × twice.

17th. × 9 w., 5 s., 3 ga., 1 s., 1 w., 2 s., 6 w., 2 s., 1 w., 1 s., 3 ga., 5 s., 9 w. × twice.

18th: × 6 w., 5 s., 3 ga., 1 s., 12 w., 1 s., 3 ga., 5 s., 6 w. × twice.

19th: × 2 w., 3 s., 1 w., 1 s., 3 ga., 1 s., 12 w., 1 s., 3 ga., 1 s., 1 w., 3 s., 2 w. × twice.

20th: × 2 w., 3 s., 2 w., 1 s., 2 ga., 1 s., 10 w., 1 s., 2 ga., 1 s., 2 w., 3 s., 2 w. × twice.

21st. × 2 w., 3 s., 3 w., 1 s., 2 ga., 1 s., 4 w., 1 s., 2 ga., 1 s., 3 w., 3 s., 2 w. × twice.

22nd. × 8 w., 1 s., 2 ga., 1 s., 2 w., 1 s., 2 ga., 1 s., 8 w.

23rd. Like 22nd.

24th × 8 w., 1 s., 2 ga., 1 s., 4 w., 1 s., 2 ga., 1 s., 8 w. × twice.

25th: × 5 w., 1 s., 1 ga., 1 s., 10 w., 1 s., 1 ga., 1 s., 5 w. × twice.

26th: × 2 w., 1 st., 1 ga., 1 st., 10 w., 1 st., 1 ga., 1 st., 2 w. × twice.

27th: × 7 w., 1 st., 1 ga., 1 st., 10 w., 1 st., 1 ga., 1 st., 7 w. × twice.

28th: × 7 w., 1 st., 1 ga., 1 st., 12 w., 1 st., 1 ga., 1 st., 7 w. × twice.

29th and 30th: Like 27th.

31st. × 8 w., 1 st., 1 ga., 1 st., 4 w., 1 st., 1 ga., 1 st., 8 w. × twice.

32nd: × 9 w., 1 st., 1 ga., 1 st., 4 w., 1 st., 1 ga., 1 st., 9 w. × twice.

33rd: × 11 w., 1 st., 1 ga., 1 st., 6 w., 1 st., 1 ga., 1 st., 11 w. × twice.

34th: × 3 w., 1 b.s., 8 w., 3 st., 10 w., 3 st., 8 w., 1 b., 3 w. × twice.

35th: × 4 w., 2 b.s., 5 w., 2 b.s., 14 w., 2 b.s., 5 w., 2 b.s., 4 w.

36th: × 6 w., 5 b.s., 18 w., 5 b.s., 6 w. × twice.

148 more white beads will be sufficient for the end.

To about the 20th row, may be threaded and used; and then, if sufficient silk is left, two, three, or more rows, may be added. The skeins being thus prepared, begin to make the purse with the garnet silk, using the white *only*, when the beads threaded on it come in the pattern.

With the finest crochet hook make a chain of 118 stitches, and form it into a round; and crochet 4 rounds quite plain. Work in the white silk.

1st Pattern Round: × 11 silk, 3 gold beads, 3 silk, 4 gold, 16 silk, 4 gold, 3 silk, 3 gold, 12 silk. × twice.

2nd (beginning to use the white beads) × 10 s., 1 g., 3 w., 1 g., 1 s., 1 g., 4 w., 1 g., 1 s., 2 st., 4 s., 1 st., 3 s., 2 st., 1 s., 1 g., 4 w., 1 g., 1 s., 1 g., 3 w., 1 g., 11 s. × twice.

3rd: × 9 s., 1 g., 4 w., 3 g., 5 w., 1 g., 2 s., 1 st., 1 s., 4 st., 1 s., 1 st., 2 s., 1 g., 5 w., 3 g., 4 w., 1 g., 10 s. × twice.

4th: × 8 s., 1 g., 14 w., 1 g., 2 s., 1 st., 4 s., 1 st., 2 s., 1 g., 14 w., 1 g., 9 s. × twice.

5th: Like 4th.

6th: × 8 s., 1 g., 14 w., 1 g., 3 s., 4 st., 3 s., 1 g., 14 w., 1 g., 9 s. × twice.

7th. × 9 s., 1 g., 2 w., 1 st. (of those on the white silk), 5 w., 1 b.s., 3 w., 1 g., 6 silk, drop on a steel bead before the next stitch, 6 s., 1 g. (over white bead), 3 w., 1 b.s., 5 w., 1 st., 2 w., 1 g., 10 silk × twice.

8th. × 5 s., 3 g., 1 s., 1 g., 2 w., 3 st., 4 w., 2 b.s., 1 w., 5 g., 2 s., 2 st., 2 s., 5 g., 1 w., 2 b.s., 4 w., 2 st., 2 w., 1 g., 1 s., 3 g., 6 s. × twice.

9th: × 4 s., 1 g., 3 w., 2 g., 2 w., 3 st., 2 w., 3 b.s., 6 w., 1 g., 2 s., drop a steel bead, 2 s., 1 g., 6 w., 3 b.s., 2 w., 3 st., 2 w., 2 g., 3 w., 1 g., 5 s. × twice.

10th: × 3 s., 1 g., 8 w., 4 st., 5 b.s., 6 w., 1 g., 2 s., 1 g., 6 w., 5 b.s., 4 st., 8 w., 1 g., 4 s. × twice.

11th: × 3 s., 1 g., 9 w., 2 st., 6 b.s., 3 w., 1 st., 3 w., 2 g., 3 w., 1 st., 3 w., 6 b.s., 2 st., 9 w., 1 g., 4 s. × twice.

12th: × 3 silk, 1 g., 9 w., 1 st., 5 b.s., 3 w., 3 st., 3 w., 2 g., 3 w., 3 st., 3 w., 5 b.s., 1 st., 9 w., 1 g., 4 s. × twice.

13th: × 3 s., 1 g., 5 w., 1 b.s., 4 w., 5 b.s. (over the 5 b.s. of last round), 6 st., 3 w., 2 g., 3 w., 6 st., 5 b.s., 4 w., 1 b.s. 5 w., 1 g., 4 s. × twice.

14th: × 3 s., 1 g., 5 w., 8 b.s., 2 ga., 5 st., 3 w., 1 g., 2 s., 1 g., 3 w., 5 st., 2 ga., 8 b.s., 5 w., 1 g., 4 s. × twice.

15th: × 4 s., 1 g., 4 w., 7 b.s., 4 ga., 4 st., 2 w., 1 g., 4 s., 1 g., 2 w., 4 st., 4 ga., 7 b.s., 4 w., 1 g., 5 s. × twice.

16th: × 5 s., 2 g., 3 w., 6 b.s., 4 ga., 3 st., 2 w., 1 g., 6 s., 1 g., 2 w., 3 st., 4 ga., 6 b.s., 3 w., 2 g., 6 s. × twice.

17th: × 6 s., 1 g., 4 w., 4 b.s., 1 st., 5 ga., 1 st., 3 w., 1 g., 6 s., 1 g., 3 w., 1 st., 5 ga., 1 st., 4 b.s., 4 w., 1 g., 7 s. × twice.

18th: × 6 s., 1 g., 6 w., 3 st., 4 ga., 1 st., 1 sil., 3 w., 2 g., 4 s., 2 g., 3 w., 1 s., 1 st., 4 ga., 3 st., 6 w., 1 g., 7 s. × twice.

19th: × 5 s., 1 g., 6 w., 5 st., 4 ga., 3 s., 3 w., 1 g., 2 s., 1 g., 3 w., 3 s., 4 ga., 5 st., 6 w., 1 g., 6 s. × twice.

20th: × 4 silk, 1 g., 3 w., 6 st., 1 w., 2 st., 5 ga., 2 s., 4 w., 2 g., 4 w., 2 s., 5 ga., 2 st., 1 w., 6 st., 3 w., 1 g., 5 s. × twice.

21st: × 4 s., 1 g., 4 w., 4 s., 2 w., 3 s., 4 ga., 3 s., 4 w., drop a gold bead off the garnet silk, between this stitch and the next, 4 w., 3 s., 4 ga., 3 st., 2 w., 4 s., 4 w., 1 g., 5 s. × twice.

22nd: × 4 s., 1 g., 9 w., 4 s., 4 ga., 5 s., 2 w., drop a gold between, as in the preceding row, 2 w., 5 s., 4 ga., 4 s., 9 w., 1 g., 5 s. × twice.

23rd: × 4 s., 1 g., 9 w., 5 s., 3 ga., 1 s., 1 w., 2 s., 3 w., drop a gold bead as before, 3 w., 1 s., 1 w., 1 s., 3 ga., 5 s., 9 w., 1 g., 5 s. × twice.

24th × 5 s., 1 g., 3 w., 2 g., 3 w., 5 s., 3 ga., 1 s., 6 w., drop a gold bead as before, 6 w., 1 s., 3 ga., 5 s., 3 w., 2 g., 3 w., 1 g., 6 s. × twice.

25th: × 6 s., 3 g., 2 s., 1 g., 2 w., 3 s., 1 w., 1 s., 3 ga., 1 s., 6 w., drop a gold bead as before, 6 w., 1 s., 3 ga., 1 s., 1 w., 3 s., 2 w., 1 g., 2 s., 3 g., 7 s. × twice.

26th: × 11 s., 1 g., 2 w., 3 s., 2 w., 1 s., 2 ga., 1 s., 4 w., 1 g., 1 w., drop a gold bead as before, 1 w., 1 g., 4 w., 1 s., 2 ga., 1 s., 2 w., 3 s., 2 w., 1 g., 12 s. × twice.

27th: × 10 s., 1 g., 2 w., 3s., 3 w., 1 s., 2 ga., 1 s., 2 w., 2 g., 1 s., 2 g., 1 s., 2 g., 2 w., 1 s., 2 ga., 1 s., 3 w., 3 s., 2 w., 1 g., 11 s. × twice.

28th: × 10 s., 1 g., 8 w., 1 s., 2 ga., 1 s., 1 w., 1 g., 8 s., 1 g., 1 w., 1 s., 2 ga., 1 s., 8 w., 1 g., 11s. × twice.

29th: Like 28th.

30th: × 10 s., 1 g., 8 w., 1s., 2 ga., 1 s., 2 w., 2 g., 4 s., 2 g., 2 w., 1 s., 2 ga., 1 s., 8 w., 1 g., 11 s. × twice.

31st: × 11 s., 1 g., 2 w., 2 g., 3 w., 1 s., 1 ga., 1 s., 5 w., 1 g., 2 s., 1 g., 5 w., 1 s., 1 ga., 1 s., 3 w., 2 g., 2 w., 1 g., 12 s. × twice.

32nd. × 4 s., 5 g., 3 s., 2 g., 2 s., 1 g., 2 w., 1 st., 1 ga., 1 st. 5 w., 1 g., 2 s., 1 g., 5 w., 1 st., 1 ga., 1 st., 2 w., 1 g., 2 s., 2 g., 3 s., 5 g., 5 s. × twice.

33rd: × 3 s., 1 g., 5 w., 1 g., 6 s., 1 g., 2 w., 1 st., 1 ga., 1 st., 5 w., 1 g., 2 s., 1 g., 5 w., 1 st., 1 ga., 1 st., 2 w., 1 g., 6 s., 1 g., 5 w., 1 g., 4 s. × twice.

34th: × 2 s., 1 g., 6 w., 1 g., 6 s., 1 g., 1 w., 1 st., 1 ga., 1 st., 6 w., 1 g., 2 s., 1 g., 6 w., 1 st., 1 ga., 1 st., 1 w., 1 g., 6 s., 1 g., 6 w., 1 g., 3 s. × twice.

35th: × 2 s., 1 g., 5 w., 2 g., 3 s., 3 g., 2 w., 1 st., 1 ga., 1 st., 5 w., 1 g., 4 s., 1 g., 5 w., 1 st., 1 ga., 1 st., 2 w., 3 g., 3 s., 2 g., 5 w., 1 g., 3 s. × twice.

36th: × 2 s., 1 g., 3 w., 3 g., 3 s., 1 g., 4 w., 1 st., 1 ga., 1 st., 5 w., 1 g., 6 s., 1 g., 5 w., 1 st., 1 ga., 1 st., 4 w., 1 g., 3 s., 3 g., 3 w., 1 g., 3 s. × twice.

37th. × 3 s., 1 g., 3 w., 1 g., 3 s., 1 g., 5 w., 1 st., 1 ga., 1 st., 2 w., 3 g., 8 s., 3 g., 2 w., 1 st., 1 ga., 1 st., 5 w., 1 g., 3 s., 1 g., 3 w., 1 g., 4 s. × twice.

38th: × 2 silk, 1 g., 5 w., 1 g., 2 s., 1 g., 4 w., 1 st., 1 ga., 1 st., 2 w., 1 g., 7 s., drop a steel bead, 7 s., 1 g., 2 w., 1 st., 1 ga., 1 st., 4 w., 1 g., 2 s., 1 g., 5 w., 1 g., 3 s. × twice.

39th. × 1 s., 1 g., 7 w., 2 g., 4 w., 1 st., 1 ga., 1 st., 3 w., 1 g., 6 s., 4 st., 6 s., 1 g., 3 w., 1 st., 1 ga., 1 st., 4 w., 2 g., 7 w., 1 g., 2 s. × twice.

40th: × 1 s., 1 g., 3 w., 1 b.s., 8 w., 3 st., 5 w., 1 g., 3 s., 1 st.; 2 s., drop one steel, 2 s., 1 st., 3 s., 1 g., 5 w., 3 st., 8 w., 1 b.s., 3 w., 1 g., 2 s. × twice.

41st. × 1 s., 1 g., 4 w., 2 b.s., 5 w., 2 b.s., 7 w., 1 g., 2 s., 1 st., 6 s., 1 st., 2 s., 1 g., 7 w., 2 b.s., 5 w., 2 b.s., 4 w., 1 g., 2 s. × twice.

42nd: × 1 s., 1 g., 6 w., 5 b.s., 9 w., 1 g., 2 s., 1 st., 6 s., 1 st., 2 s., 1 g., 9 w., 5 b.s., 6 w., 1 g., 2 s. × twice.

43rd: × 2 silk, 1 g., 18 w., 1 g., 4 s., 1 st., 4 s., 1 st., 4 s., 1 g., 18 w., 1 g., 3 s. × twice.

44th: × 3 s., 5 g., 6 w., 3 g., 8 w., 1 g., 5 s., 1 st., 4 s., 1 st., 5 s., 1 g., 3 w., 3 g., 6 w., 5 g., 4 s. × twice.

45th: × 2 s., 1 st., 4 s., 1 g., 6 w., 1 g., 2 s., 3 g., 4 s., 2 st., 6 s., 2 st., 4 s., 3 g., 2 s., 1 g., 6 w., 1 g., 4 s., 1 st., 3 s. × twice.

46th. × 2 s., 1 st., 5 s., 1 g., 4 w., 1 g., 9 s., 1 st., 10 s., 1 st., 9 s., 1 g., 4 w., 1 g., 5 s.; 1 st., 3 s. × twice.

47th. × 3 s., 1 st., 5 s., 4 g., 10 s., 1 st., 2 s., 2 st., 2 s., 2 st., 2 s., 1 st., 10 s., 4 g., 5 s., 1 st., 4 s. × twice.

48th: × 3 s., 1 st., 29 s., 2 st., 1 s., 1 st., 2 s. 1 st., 1 s., 2 st., 29 s., 1 st., 4 s. × twice.

49th: × 2 s., 1 st., 12 s., 2 st., 11 s., 2 st., 11 s., 2 st., 12 s., 1 st., 3 s. × twice.

50th: 2 s., 1 st., 3 s., 3 st., 5 s., 1 st., 2 s., 1 st., 2 s., 3 st., 5 s., 2 st., 5 s., 3 st., 2 s., 1 st., 2 s., 1 st., 5 s., 3 st., 3 s., 1 st., 3 s. × twice.

51st: × 3 s., 1 st., 1 s., 1 st.; 3 s., 1 st., 2 s., 2 st., 1 s., 2 st., 2 s., 1 st., 3 s., 1 st., 3 s., 1 st., 2 s., 1 st., 3 s., 1 st., 3 s., 1 st., 2 s., 2 st., 1 s., 2 st., 2 s., 1 st., 3 s., 1 st., 1 s., 1 st., 4 s. × twice.

52nd. × 4 s., 2 st., 2 s., 1 st., 2 s., 1 st., 2 s., 1 st., 5 s., 1 st., 2 s., 1 st., 2 s., 1 st., 4 s., 1 st., 2 s., 1 st., 2 s., 1 st., 5 s., 1 st., 2 s., 1 st., 2 s., 1 st., 2 s., 2 st., 5 s.

53rd. × 3 s., 1 st., 2 s., 1 st., 1 s., 1 st., 2 s., 1 st., 1 s., 1 st., 2 s., 2 st., 2 s., 1 st., 1 s., 1 st., 2 s., 1 st., 6 s., 1 st., 2 s., 1 st., 4 s., 1 st., 2 s., 2 st., 2 s., 1 st., 1 s., 1 st., 2s., 1 st., 1 s., 1 st., 2 s., 1 st., 4 s. × twice.

54th: × 4 s., 2 st., 3 s., 2 st., 2 s., 4 st., 1 s., 2 st., 3 s.; 2 st., 8 s., 2 st., 3 s., 2 st., 1 s., 4 st. 2 s., 2 st., 3 s., 2 st., 5 s. × twice.

This is the last round of the pattern; three plain single crochet rounds complete the end. Work one round in beginning the centre of the purse, × dc., 1 ch., miss 1—× repeat all round. After this, instead of working *round*, work backwards and forwards, taking care to make the opening at the centre of one side, parallel with the line where the beads were dropped. Take the stitches always *under* the chain, and make the dc. stitch of one row come over the chain of the last. When necessary, to secure this, work 2 dc. at the end, or beginning of the row. Do. 38 rows, and then a round, rising the coarser hook for the whole of this centre.

Slip on the rings; and when the other end is worked, connect it with the centre by a round of single crochet.

Sew on the garnitures, and the purse will be complete.

EMBROIDERED BRACES.

Materials.—A strip of fawn-coloured kid leather, long enough for one brace, and broad enough for two; at least eight shades of crimson embroidery silk, from black to pink; six shades of blue green, ditto yellow green; a skein of brown; a little gold thread, gold bullion, and a few steel beads.

These braces should be lined with buckskin, and bound with narrow sarsnet ribbon of the colour of the kid, with which the fittings should also correspond; but being a troublesome part of the work, and one which requires practice to do it well, we should recommend our fair friends to confine their labour to the decorative part, and then have them made up at a first-rate shop.

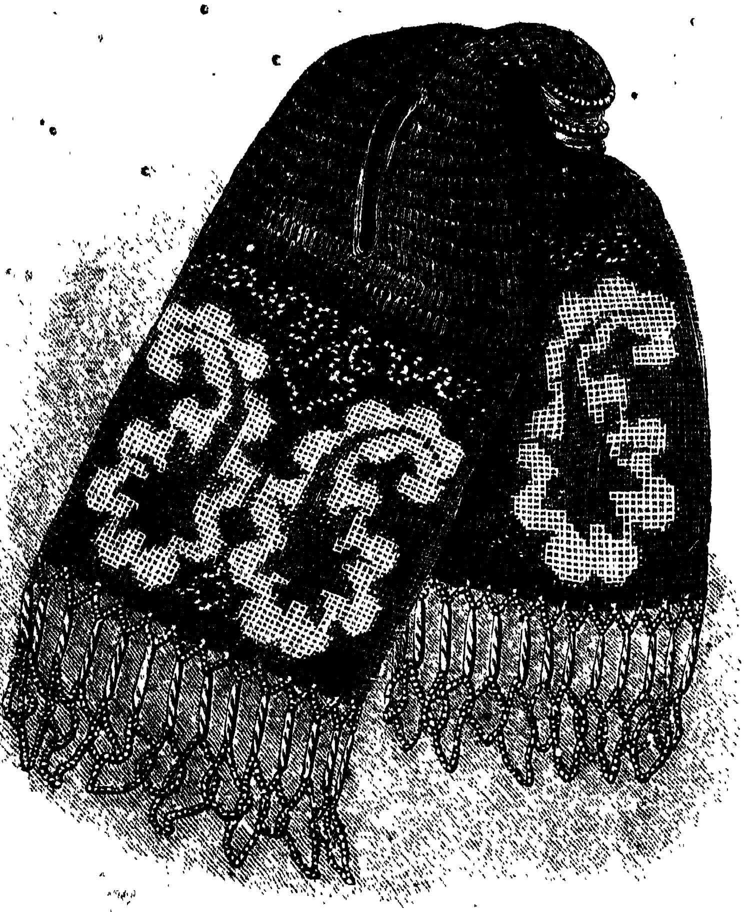
The design consists of dahlias and leaves, of which a section is given the full size, that the worker may trace the pattern from it. The most fashionable braces are made now narrower at the ends. Those who are sufficiently good artists sh[illegible] diminish the pattern from the centre at each repetition, so [illegible] make the embroidery of the ends not much more than half the width. It may terminate with a few small leaves, arranged *ad libitum.*

The flowers are worked in shades of crimson, each petal having two shades, except the darkest, which are quite black, and the lightest, which are entirely pink. To prevent monotony, all the shades are only introduced into every alternate flower, the intermediate ones having the two lightest tints omitted. Should the worker happen to have a stock of silks of other colours, as straw, lilac, &c., some of the flowers may be worked in them, always provided there really exist dahlias of the colours proposed to be used. The stitches, throughout, radiate from the centre of the flower, which is formed thus:—A single steel bead forms the eye, and is surrounded by gold bullion, and, further, by loops of the same material. For this purpose, bring the needle (threaded with gold-coloured silk), up where the loop is to be made; slip on it a morsel of bullion a quarter of an inch long, and pass the needle down again in the same place. Each flower has eight of these loops in the eye. The small buds are made by a steel bead, surrounded by gold bullion.

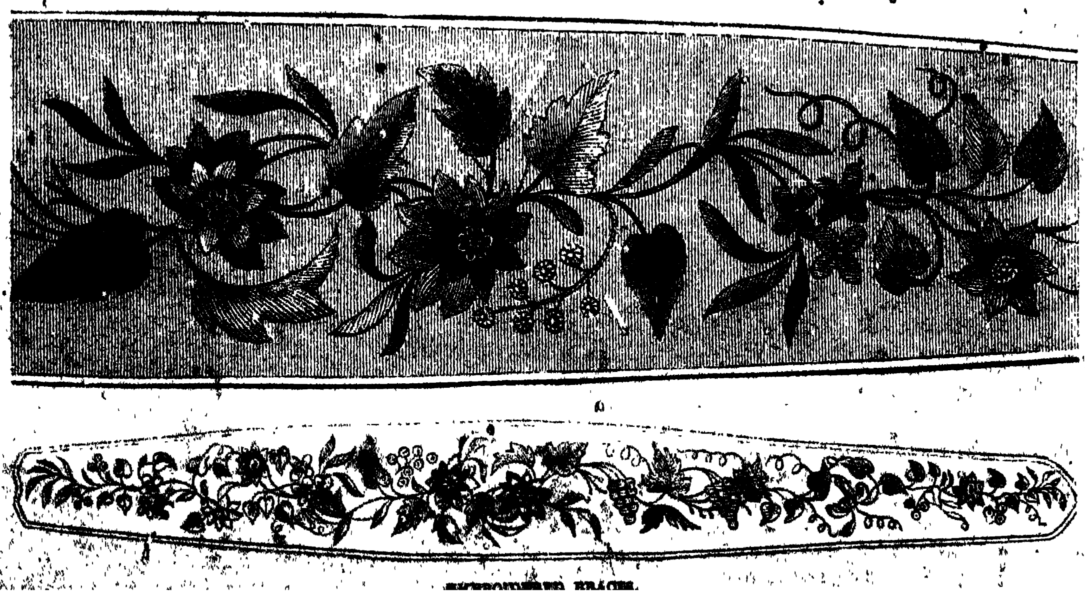
The leaves are worked in the various green silks, with at least two or three shades in every leaf, and many more in some of them. The greater part of the stems are in gold thread, laid on; but a few have green or brown silk, worked in half polka stitch.

In working the leaves, observe carefully that consecutive shades of green only must be used in each; there should be no violent contrasts.

For the proper way of making and preparing embroidery, and for definitions of the stitches used, we refer to previous numbers of the Illustrated Exhibitor and Magazine of Art.



PURSE (CROCHET AND BEADS).—*See page* 62.



EMBROIDERED BRACES.

SWITZERLAND IN WINTER.

FROZEN CASCADE OF GIESSBACH.

If the tourists who crowd to Switzerland every summer were to revisit it in winter, they would, in many instances, find themselves unable to recognise the scenes which had afforded them so much enjoyment a few months previously. Everything seems petrified and dead. There are now no flocks wandering along the sides of the mountains, and no streams dashing along the hady valleys. The silence also is profound, almost painful. The heavy laden trees stand stiff and motionless. The snow lies n everything like a shroud, and all beneath seems lifeless. The ascades, which, when last seen, sparkled so merrily in the sun, nd leaped from the rock with so loud a roar, are now bound up n a great mass of ice. The echoes, too, are gone. The blast of a trumpet dies as soon as blown. The mountains presenting but one mass of whiteness, the eye can no longer measure their respective distances, nor distinguish the loftiest peaks. The lakes which reflected all the colours of the rainbow in summer, now sleep dark and sombre, presenting a gloomy contrast to the snowy borders which surround them. Nature has the appearance of a vast desert, the very desolation of which is sublime beyond measure. The only sign of life to be seen anywhere is the tall column of pale blue smoke curling slowly up, perhaps from the neighbouring village. The road leading to it is cleared for one or two hundred yards, and on entering you find every house carefully disengaged from the vast masses of snow which collect around it. Other pathways lead from the dwelling-house to the stable and the shed in which the wood for fuel is stored—to the church and the churchyard. Sorrow for the past, and hope for the future are probably stronger here, in the midst of this desolation, than anywhere.

Perhaps in no part of the world is foresight so necessary and so general amongst the peasantry as in Switzerland. During the long winter the inhabitants of each village are perfectly isolated from the rest of the world, and, unlike the denizens of the polar regions, who can resume their hunting and fishing with but little preparation on the return of summer, the Swiss farmer must have the seed ready to sow immediately upon the melting of the snow, and all the necessary implements laid by ready for use, because, ere he could return from the nearest town, the best part of his short summer might have fled. Everything, too, is prepared for unforeseen accidents, for sickness, and even for death. Each village becomes for the time a little commonwealth, independent of all others. The priest or minister, in most instances, has charge of the medicine chest; and when all his efforts to alleviate bodily suffering have failed, he administers to the dying the consolations of religion.

Their insulated position causes the inhabitants to look upon one another as members of one large family, whose interests and welfare are inseparable. The daily rendering of trifling services nourishes the growth of kindly feeling. The poor, if there are any, are fed and taken care of; and in many of these secluded localities the Swiss peasant would stare with astonishment if told that in other parts of the world the pittance of relief for the destitute was extorted by law and paid with grumbling reluctance.

The village is generally during winter buried in silence. The inhabitants are seldom seen out of doors, except now and then a female bringing in wood from the storehouse for the fire, or the men procuring forage for the cattle. They have, however, their hours of sport and hilarity. The bell calls them to church, and the children to school; and upon their release the latter amuse themselves with making men of snow or sliding on the lake.

In some of the deep valleys the day is as short as the horizon is narrow, and in some of these the sun is never seen during many months. His rays every day gild the crest of the opposite mountain, but away in the depths below all is sombre, cold, and gloomy. It is a happy day for the inhabitants when his disc is first seen peeping over the edge of the snow. Spring is then at hand. But a wonderful difference exists at all times between the temperature of the southern declivities and the northern. The sun darts his rays full upon the former, but on the latter he never shines either in winter or in summer.

The reader would have but a very imperfect idea of an Alpine winter, if we omitted mentioning the wonderful effects which the light produces during that season. The appearances presented on a calm evening far surpass all the glories of the finest summer. The rosiest and liveliest tints take place of the dull and monotonous white; the lakes seem like floods of molten gold, or a great fire rising up from the centre of the earth. The trees and rocks, and even the vapours which begin to ascend on the approach of night, assume a roseate tint, which makes the whole landscape seem like a scene of fairy land. At last the mountain shadow falls wider and deeper over all, and everything is cold and lifeless as before.

Like all inhabitants of mountainous regions, the Swiss are very superstitious. Old and young believe in the existence of genii who wander amongst the avalanches, and delight in the tempests and whirlwinds which rage amongst the mountain tops. It is not long since the old men told by the winter firesides of the dangers which haunted the caverns, and a "giant of the mountains" whose voice could be heard above the ravings of the wildest storm. These sprites and ogres are, however, fast disappearing before the progress of education and enlightenment.

There is hardly any region in the world containing more that is both interesting and instructive, not to the mere traveller for pleasure only, but to the philosopher and the artist; and the simple pastoral life of the people of those secluded valleys presents a charming picture of innocence, content, and patient endurance of suffering and hardship, to him whose ear has been pained, and heart sickened by the vices and enormities of more civilised and more favoured climes. In the history of these mountaineers there is many a page which reflects the highest honour on human nature—of faithfulness to the ties of honour, duty, patriotism, and love, which has ten thousand times proved stronger than a death surrounded with horrors.

A few years ago, a peasant left his native village, in winter, for the purpose of making some purchases in the chief town of the district. He was accompanied by his two sons, one of whom was five years old, and the other younger. Finding that he would be compelled to wait longer than he had expected, he sent the two boys on, that they might reach home before it was night, as it was the month of November, when the heavy falls of snow generally take place. The storm overtook them on their way. The snow fell in great flakes, and the wind blew it in their faces, blinding them, and impeding their progress. The tempest howled fitfully through the ravines of the mountains, and the tall pines creaked ominously. The desolation of the whole scene was appalling; and the road at last disappeared beneath its white covering, and their progress became slow and fatiguing. The younger of the two lost courage, and began to sink fast. The older encouraged him as much as he could, and at last he took him on his shoulders, and thus staggered on a little farther. Had he not come so far, he would have returned to the town; but believing himself not more than half a league from home, he determined to make a struggle to reach it. At length, unable to go on, he laid his little brother on the snow, and, finding he could not save him, he determined to perish with him.

"What are you about, Nicholas?" said the little hero; "go on, and try and get help from the village; and then you will be saved yourself, and maybe save me too." His brother then perceiving a sort of cavern in the rock, on the other side of the road, carried him over, and placed him in it; and, to mark the spot, he placed in the snow beside it a young cherry-tree, which his father had that day purchased in the market, to plant in his garden. He then set forward in quest of assistance.

The father, becoming alarmed on seeing the storm, hastened homeward. His anxiety increased as he proceeded, and, judging from the difficulty which he himself experienced in making his way, he shuddered to think of what his children must have been suffering. He kept a close watch on each side of the road as he passed on, fearing lest they might have taken refuge under some tree, and that he might pass without seeing them.

At length he reached the cherry-tree, which still raised its head above the snow, beside the place in which the child was lying, already buried deeply. He snatched it up with the liveliest joy, feeling confident that they were not far off, and had cast aside the plant that they might walk with greater ease. He placed it on his shoulder, and had gone on a few hundred yards, when the thought struck him that it was a signal of distress, and that they were both lying close at hand. Retracing his steps, he tore away the snow, and there was his child; but cold and insensible. Frantic with grief, he continued to search, still believing that the other could not be far distant.

At length, wearied and disconsolate, he took the inanimate body in his arms, and proceeded homewards. He had not reached half-way, when he was met by some of his neighbours, carrying the other boy on their shoulders, whom they had brought back, though unable to walk, to point out to them the resting-place of his brother. To describe the meeting and the explanation, would need the pencil of a Wilkie. Their sorrow was, however, soon turned to complete rejoicing, by the restoration of the younger child.

There is, however, one malady peculiar to the Alpine vallies, which sadly mars the bright pictures which the imagination of the English reader may have drawn of the charms of this retired and simple life. In those low recesses, where the sun never shines, the malaria arising from the ungenial soil, and the constant use of snow-water, brings on a most horrible form of physical and mental deformity. A frightful tumour, known as the *goître*, grows on one side of the neck, distorting the countenance, and throwing the head to one side. The unhappy victim, at the same time, sinks into helpless, hopeless, and repulsive idiotcy. And, worse still, the misfortune becomes hereditary, and is sometimes perpetuated from generation to generation. Attempts have of late been made to effect cures by removal to better air, and giving gradually-increasing occupation to the mind. But, we fear, they have only been partially successful.

THE ORLEANS FAMILY.

Life never opens fairer than on the sons of kings. All that earth can give is theirs. The wearying toil and strife by which ambition slowly wins its way, are to them unknown. In time, they may learn the vanity and vexation of spirit which the Royal Preacher found in all created things; in time, they may learn how hollow and vain are the smiles of beauty, the flatteries of needy courtiers, the allurements of riches, or the sweets of power; but the youth of royalty sees not the lie, masked with such rare cunning, in the conventional homage that awaits it. To its impassioned gaze everything is fresh, and fair, and true.

Yet strange historic memories are connected with royal children. To every one of them belongs a mournful past. For instance, we take the names of the Count of Paris and the Duke of Chartres, children of the Duchess of Orleans, and one of them, by the abdication of Louis Philippe, at one time on the point of becoming King of France. In the Chamber of Deputies stood the widowed mother with the young candidate for a crown. The whole assembly was deeply impressed; the majority were about to ratify the act which should place the sceptre of the Grande Monarque in hands so young, when the scene was changed. The doors were burst open—an armed rabble rushed in—royalty fell—and on the ruins of the throne a, to all appearances, short-lived republic arose. Our artist painted these royal children when all was calm—when no storm loomed in the future. Soon for them came change, and those children, deprived of their ancient heritage, are now exiles in foreign lands.

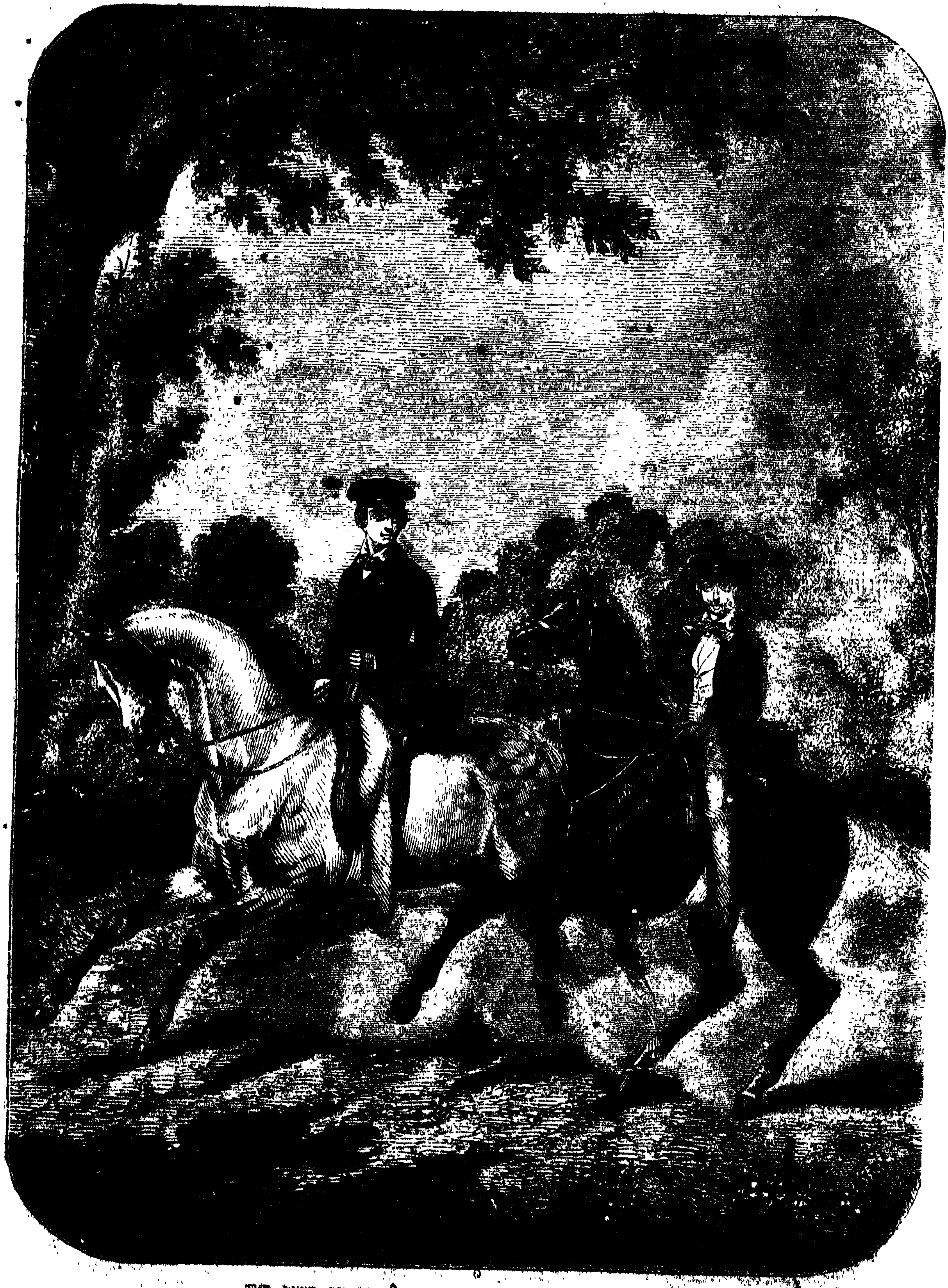
An unenviable history is that of the Orleans family, and but little of historic renown is theirs. That an Orleans would betray those who raised him to power became a proverb at an early period. The annals of the family are dark indeed. We will briefly glance at them.

In the renowned diary of Mr. Pepys we read:—"The Princess Henrietta is very pretty, but much below my expectation; and her dressing of herself with her hair frizzed short up her ears, did make her seem so much the less to me. But," adds Mr. Pepys, in a strain of which every married lady must approve, "my wife, standing near her, with two or three black patches on, and well dressed, did seem to me much handsomer than she." This Princess Henrietta, the sister of Charles II., became the wife of that Duke of Orleans who is known in history principally as the head of that long line, the last of whom lamentably died ere the splendour of his family had passed away as a dream. The marriage was an unhappy one. The French court was sunk in depravity. Those were the days, as Macaulay has remarked, speaking of English history at the same period, of sensuality without love—of dwarfish virtues—of gigantic vices. One bright June morning, Henrietta rose earlier than usual, to visit her only child, afterwards Queen of Spain, and whose fate was to be as melancholy as her own. The day was passed in the discharge of the duties of her station. In the evening she was seized with violent spasms. A cry of alarm was heard in the Palace of St. Cloud. Medical skill availed nothing against the poison which an enemy had administered; and while Bossuet knelt by her bedside, a convulsive sob was heard—the crucifix escaped from the relaxed fingers—and Henrietta of Orleans was no more.

But we proceed to relate the history of the Orleans family. The duke married a second wife, Charlotte Elizabeth, of Bavaria, cousin of George I., of England, a lady who seems to have embraced Roman Catholicism for the same reason as her aunt Sophia, Electress of Hanover, remained true to the Protestant faith, without which the crown of England would never have gone into her family. This lady, in her memoirs, tells us, "On our arrival in France, three bishops were sent to confer with me on religion. They all three differed in their creeds. I took the essence of their opinions, and made a religion for myself." As she arrived in France when the Jansenist controversy raged most fiercely, it is no wonder that she found great differences of opinion amongst her episcopal instructors. The task of extracting the essence of their dogmas did not take any great length of time. On the very day of the conference the princess abjured Lutheranism, made her confession, and went through the ceremony of marriage. "Many people thought," said Mademoiselle Montpensier, "that she got through a good deal of business in one day." The lady was mother of the celebrated regent, to whom she appears to have been fondly attached. One of the greatest afflictions of her life was his marriage with one of the illegitimate daughters of Louis XIV.

Philip of Orleans, the son of the first Duke of Orleans, infamous in history as the Regent, requires to be drawn with no common care. Trained in a bad school, he early left his teachers behind. The excessive indulgence of his father, and the rigid severity of his mother, combined in perverting his character. In everything he was precocious. The Palais Royal was a hot-bed, in which he rapidly grew to an unnatural maturity. At the age of sixteen he had the experience in vice of a man of sixty. On the death of his father he became the richest subject in France, and began that career of ostentatious licentiousness which paved the way for that reaction against royalty which filled Europe with fear, and deluged France with blood. Louis XIV. said of him, "He is as bad as can well be represented, and, further, he boasts of vices which he does not possess." But his great talents enabled him to control the destinies of Europe. His mother happily said, "The fairies were invited to witness his birth, and each endowed him with a special talent. Unfortunately, one fairy was forgotten, who, arriving after the rest, said, 'He shall have all these talents, but he shall want one—the power of making a good use of any.'" On the death of Louis XIV. a new career was opened for his ambition. He was then in his forty-second year. Time had dealt kindly with him, and the death of Louis removed the only restraint under which he laid. His suppers at the Palais Royal were the most scandalous orgies ever permitted in a civilised country. St. Simond says, "They were eaten in strange company. His mistresses, sometimes an opera girl, often his daughter, the Duchess de Berri, and a dozen men, his depraved companions, whom he unceremoniously called *roués*, intimating that each had committed crimes for which he deserved to be brought to the wheel. To these were added some of his officers, a few wild youths, ladies of high rank, but blemished reputation, and some persons of the lower rank, distinguished for their wit or depravity. The supper, consisting of the most exquisite viands, was dressed in a place prepared for the purpose, all the utensils being of silver. The guests themselves often shared the toil of cooks. At these meetings, everybody was passed in review—ministers and acquaintances, as well as others—with a freedom which amounted to licentiousness: the past and present intrigues of the court and city, old tales, disputes, jests, and jokes—no person or thing was spared. They drank deeply—they grew warm with wine—they uttered the most depraved sentiments, and vied with each other in blasphemy. When they had made noise enough, and were all intoxicated, they staggered to bed, to revel the same scenes on the following day." Nor did the Regent's accession to power bring more restraint or regard to the decencies of life. Still clever, and sceptical, and abandoned—a union of Don Juan and Mephistopheles—he played out his part as philosopher, and statesman, and rake. To contrive leisure for his criminal indulgences, the Regent entrusted the entire administration of State affairs to the notorious Dubois. But dissipation soon began to tell upon his frame; his face became blotched; apoplectic symptoms appeared. His physicians warned him, but in vain. One December evening, after a sumptuous dinner, he retired to the apartment of the young and beautiful Duchess of Phalaris, who had sacrificed her husband and her honour for his smiles. She began to tell him a story, but before the first sentence was finished, the duke was a corpse. Without space for repentance—unprepared—in the very midst of his vicious career—in the full blaze of his pomp and splendour—he was arrested by the hand of death.

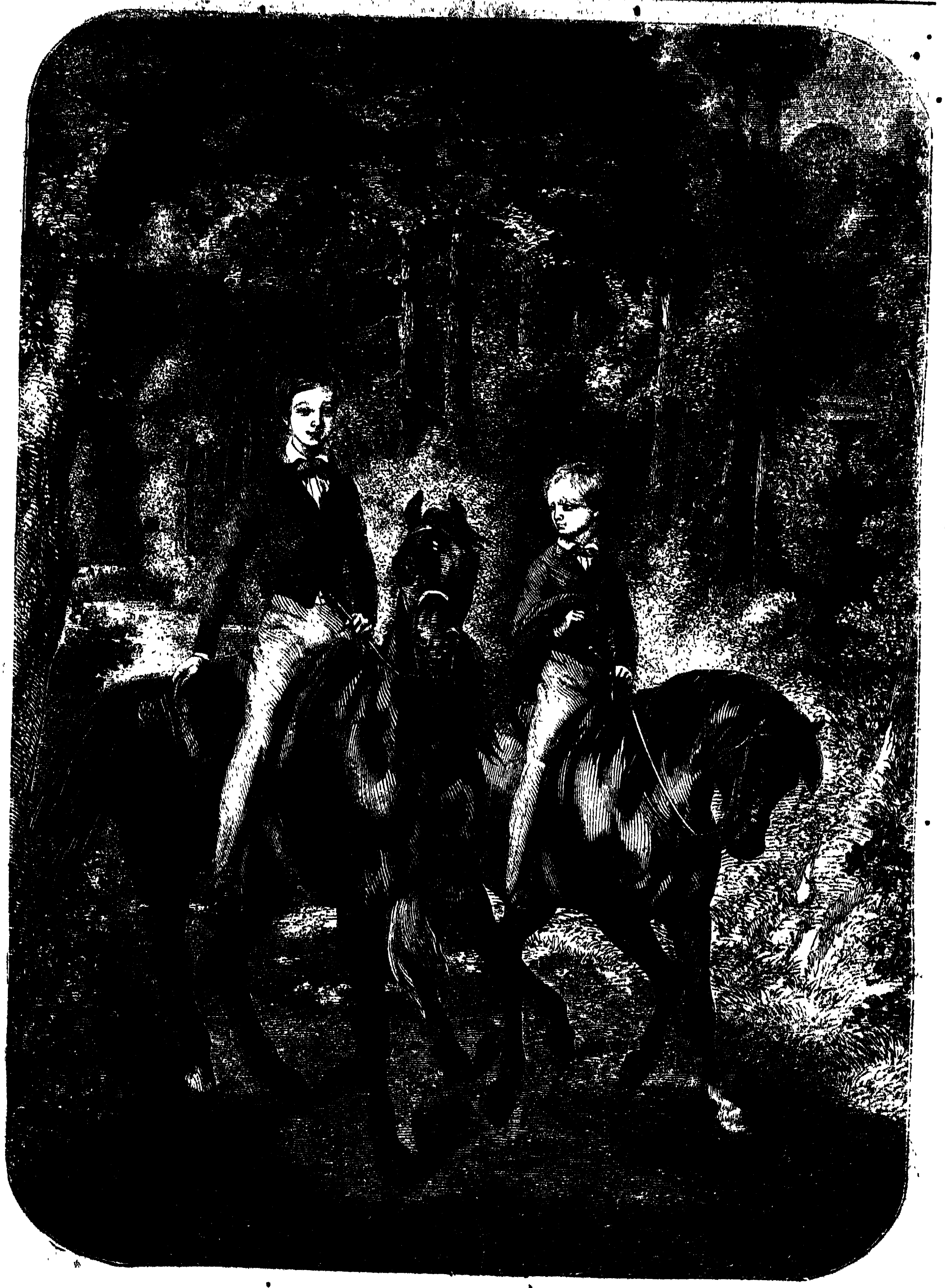
The "devout" Duke of Orleans succeeded to the wealth, but not to the power, of the Regent. A change came o'er the spirit of the dream. The chambers of the Palais Royal were cleaned out, and



THE DUKE DE BRABANT AND THE COUNT DE FLANDRE.

(From a Painting by M. de Montpezat.)

the devils were expelled. No longer did it resound with the language of ribaldry and blasphemy—no longer were its saloons defiled by the presence of men without honour and women without shame. The duke led the life of a scholastic divine. The works of the Jansenists, and of Thomas Aquinas, were the writings he admired and imitated. We must record one other fact to his credit. He founded a professorship of Biblical Hebrew at the Sorbonne, "in order," as he declared, "that heretics should not



THE COUNT DE PARIS AND THE DUKE DE CHARTRES.

(*From a Painting by M. Alfred de Dreux.*)

be the only Christians who studied the Holy Scriptures in their original languages." The grandson of the Regent led an equally uneventful life. He was popular in Paris. His literary tastes were elegant. The jealousy of the elder branch of the House of Bourbon refused him any high office, and he lived chiefly in the company of men of letters, and died before commenced that reign of terror under which his ill-fated son laid down his life.

We must now speak of Philippe Egalité, who appears to have made the vices of the Regent his study, and not in vain; still he was not so bad as represented. He was vicious, and a libertine; but not a monster. But we need not sketch him at further length. His popularity when the revolution commenced—his acquiescence in the vote which sent Louis XVI. to the guillotine—his own violent death, which he met with a fortitude worthy the occasion—are all known to our readers.* Still less necessary is it for us to give the chequered career of his son, whose life closed, as so much of it had been spent, in exile, after he had realised the most ambitious scheme of the Orleans branch of the Bourbons, and ascended the throne of France. The last duke of that name perished by an accident whilst travelling, and the only descendants of a name associated with so much of fame and infamy, of glory and of shame, are the Count of Paris and the Duke of Chartres. Their cousins, the Duke of Brabant and the Count of Flanders, children of Leopold, King of the Belgians, have had a more equable fate.

The chequered career of Louis Philippe, Duke of Orleans, during the early part of his life, is known to most of our readers. He for years wandered over Europe in abject poverty, and in succession visited England and America. His history during this period of his life is a romance in itself; but our limited space will, of course, not permit us to enter into details. During his wanderings he visited Sicily, and, while there, became deeply enamoured of the Princess Maria Amelia, daughter of Ferdinand IV., of Naples, and Marie Carolina, of Austria. The Queen showed herself, for a long time, anything but favourably disposed towards him; but at length, by the influence of his mother and sister, who, after many vicissitudes of fortune, rejoined him in Sicily, all impediments to his suit were removed, and on the twenty-fifth of November, 1809, he was married to the Princess, to whom he was warmly attached. Early in October, 1810, she gave birth to a son—the late lamented Duke d' Orleans—who was killed by accident when out driving. Two daughters were subsequently added to the Orleans family during their residence in Sicily.

For some time after the restoration, Louis Philippe lived in retirement, attending to the cultivation of his estates, as he was coldly received by Louis XVIII. after the battle of Waterloo. After the accession of Charles X. he went more frequently to court, and was graciously received, though he and the king were of opposite politics. Upon the fall of that monarch, as is well known, the crown was offered him, and he ascended the throne as "Louis Philippe, King of the French." When Belgium separated from Holland, the crown was offered to the Duke de Nemours, second son of the King of the French, but the latter rejected an arrangement which would have given umbrage to the allied powers. Prince Leopold of Saxe Coburg, widower of the Princess Charlotte of Wales, was then selected; and soon after his elevation he married a daughter of Louis Philippe, and thus became as closely connected with the royal family of France as he was with that of England. Some time afterwards the Prince de Joinville, the present Duke of Orleans, was married to the Princess Francesca, sister of the Emperor of Brazil and Queen of Portugal.

His efforts for the firm establishment of his family upon the throne, by the marriage of his son, the Duke of Montpensier, with the Infanta of Spain, daughter of Christina—his great affection for all the members of it—his overthrow and expulsion in 1848—his flight to England, and death in 1850 at Claremont—are known to all.

The Duke d'Aumale and Prince de Joinville, the sons of Louis Philippe, and grandsons of the unfortunate Philippe Egalité, distinguished themselves, previous to the revolution of 1848, in the French army and navy. The former displayed undaunted courage in various conflicts in Algeria, and the latter prided himself in no small degree upon his skill in maritime affairs. The pamphlet which he published a few years before his father's overthrow is, doubtless, still fresh in the minds of our readers, in which he attempted to demonstrate the practicability of making a successful descent upon England. That it was vain-glory, and a desire to win popularity amongst the soldiery, rather than any serious hope that his schemes would be carried into execution, which prompted him to turn author, we can have no doubt whatever; but it is not less certain that the effect produced upon the minds of the French people was anything but beneficial.

He also distinguished himself by his bombardment of Mogador upon very trivial pretences. When the revolution took place in 1848 the two princes at once resigned their commands, and took refuge in England. Joinville issued a farewell address to the French army and people, making the usual bombastic allusions to "France" and "glory," with which so many mock heroes have gulled the French people. They were then forbidden to appear on French territory,—a decree which we believe still remains unrevoked, and now that Louis Napoleon has ascended the throne, there is of course every probability of its being enforced with greater stringency than ever. What the future of those young nobles may be, we cannot say. Time alone can tell whether France will once more welcome back the Orleans family to their native land. Meanwhile, their history is but one of the series of illustrations with which this world abounds—illustrations of hopes disappointed—of pomp, and splendour, and affluence, and power, succeeded by exile, and infamy, and beggary, and want.

A VISIT TO APSLEY PELLATT'S FLINT GLASS WORKS.

(*Concluded from page 59.*)

Having spoken thus far of the preliminary processes—the furnace and management of a glass-house, with the constituents of flint-glass, and so forth—let us suppose we are standing in the glass-house, watching the operation of

MAKING A WINE-GLASS.

This domestic utensil a visitor generally sees made first; and few of us imagine what ingenuity is exerted in its production. First, the workman takes from the pot a sufficient "gathering" of the red-hot glass, which adheres to the blowing-iron. He next rolls it on the marver, or cast-iron slab, and, slightly swinging it round, blows through the pipe, so as to expand the metal sufficiently for the bowl of the glass. Another workman, seated at the chair, then receives the mass, and further shapes it by means of the pucellas and battledore, by which latter instrument the end is flattened. A second workman then brings a smaller gathering of fused glass, and places it to the end of the bowl, to which it immediately adheres. This is the stem. A few turns on the chair-handles, and a few slight touches of the pucellas, and the glass is ready to receive the foot. Another workman, called the "footer," brings a third gathering on the end of a blowing-iron. This is shaped like a small globe, and is instantly attached to the stem and opened out, and flattened by the workman at the chair till, in a moment almost, the glass is formed. A pontil, with a small piece of metal on it, is attached to the foot, and the glass is cracked off by a small blow of the cold pucellas. The glass is then re-heated at the pot's mouth, the bowl cleverly sheared round the edge, and the glass is, lastly, knocked off the pontil by a smart blow, and is taken away by a boy to the annealing-oven. This operation, so long in telling, and apparently so complex, is the work of about three minutes! The wine-glass we have described is made in three pieces; but similar [illegible] frequently made in two pieces; and such is the dexterity exhibited by the chief workman—a dexterity only acquired by years of practice—that any number of glasses may be made of a particular pattern, with little or no tool-work, without the slightest apparent difference or variation of one from another. It must be understood that glass, in a state of fusion, has an affinity for glass in a similar condition, and that between each operation, as above described, the object has to be re-heated at the pot's mouth, and kept constantly rotating. The extreme rapidity with which these operations are performed is most astonishing. You watch the workman as you would a conjurer, and the results are quite as surprising in the one case as in the other. The glass is in such a state of semi-liquidity, that it would drop from the tube if it were not kept in a state of constant rotation; while, on the other hand, it can be hoisted, shaped, elongated, cut, pressed, and fashioned, at the will of the workman.

Ornamental glass articles—such as drinking-glasses, decanters, cruets, lamps, chimneys, and globes, lustres for chandeliers, vases, tubes for thermometers, and the immense variety of objects in coloured glass—are all composed of the best flint-glass, while the common kinds of bottles and domestic utensils are made of an inferior sort of metal. The description we have given above will serve, with some few modifications, for a great number of articles. Thus, while we were present, we saw some goblets made, to which handles were attached. Here the taste and ingenuity of the workman was most severely tested. As before, the mass of red-hot metal was taken from the pot, rolled on the marver, blown out, shaped, whirled round, or "flashed," as it is called, re-heated, the stem and foot attached, and re-heated again. Then a boy brings, at the end of a pontil, a lump of glass, which the chief workman seizes at once with the tongs, and by a dexterous movement, which occupies less time than we do in describing it, attaches it to the goblet, draws it out, and, curving it elegantly upwards, attaches its other end to the upper part of the object. The ingenuity of this movement will be appreciated, when the reader knows that the workman has no guide but his eye in forming this handle, and that so accurately is the operation performed, that no difference can be perceived in the shape of a hundred handles.

In making a

CYLINDRICAL LAMP-GLASS,

considerable care is requisite, as these also must be of one size and pattern. A gathering of sufficient quantity is taken up by the blow-pipe, which is swung to and fro like a pendulum, and round the head of the workman like a conjuror's rope and balls. As the quantity of metal necessary is but small and light, the throw must be sharp and decided. The first solid gathering is expanded and swung out until it acquires a shape something like a cucumber; it is re-heated and swung again to elongate it, and the end is "whetted off" by contact with cold iron; it is then opened out with the pucellas, in which state it is called a "muff." A post or disk is applied to the other end, and it is finally knocked off and taken away to be annealed. The rough surface left at either end is afterwards ground smooth.

In making what are called

BLOWN-OFF DISHES, SALT-CELLARS, &c.,

much ingenuity is exerted. An oblong dish of ten inches long weighs about six pounds, and requires two or three gatherings of metal. When it has been well rolled and flattened into a crude square or other form upon the marver, the workman ascends the chair, and presses it into a brass mould previously placed on the ground, urging the pressure by blowing, frequent lifting, and again as it were stamping it into the mould; and at last increasing the inflation from the lungs, and greatly expanding the upper part of the dish, called the blow-over, till it becomes so thin at parts as sometimes to explode. A piece of wood is used to knock off the lower part of the overplus, leaving the dish of considerable substance, which is then turned out of the mould to be annealed. In this way are formed nearly all dessert dishes, and other flat and shallow domestic utensils.

The mention of a mould naturally brings us to the consideration of

THE METHOD OF MAKING GLASS BOTTLES.

The bottles used by perfumers, apothecaries, and wine merchants, are all made upon one principle—that is to say, they are blown out in a mould. Without close attention, the minutiæ of this operation eludes the eye, so quickly is it performed. The workman first takes a gathering from the pot with his blowing-iron, and after rolling it on the marver, to give it a cylindrical form, pinches it at one end, by means of a small instrument, to form the neck. He next inserts the end of the tube into a small brass mould lying on the ground, and blows through the tube. This causes the glass to fill up the cavity of the mould, which is formed of two pieces joined together at the bottom by a hinge. The mould being opened by the withdrawal of the workman's foot from a spring, the bottle, completely formed except the neck, is withdrawn, still attached to the end of the tube. It is now knocked off the tube and received by another workman, who, after taking it up at the end of an iron rod, reheats it at the "castor-hole," the small opening of an inferior furnace, and, with a few simple tools, forms the neck. This operation, which goes on continuously and regularly, occupies about half a minute. As soon as one workman has left the mould, another, with a similar lump of red-hot glass, takes his place; and so quickly is the whole process carried forward, that one workman can form the necks of the bottles which three others are employed in moulding. The mould is kept nearly red-hot, by means of a small furnace, without which precaution the exterior of the bottles would become "ruffled," and be deficient in the necessary polish, A slight seam is left at the junction of the mould, which is not observable in square perfumery bottles, where the joints are at the edges.

In the kind of ornamentation called

ROMAN MOULDED PILLARS,

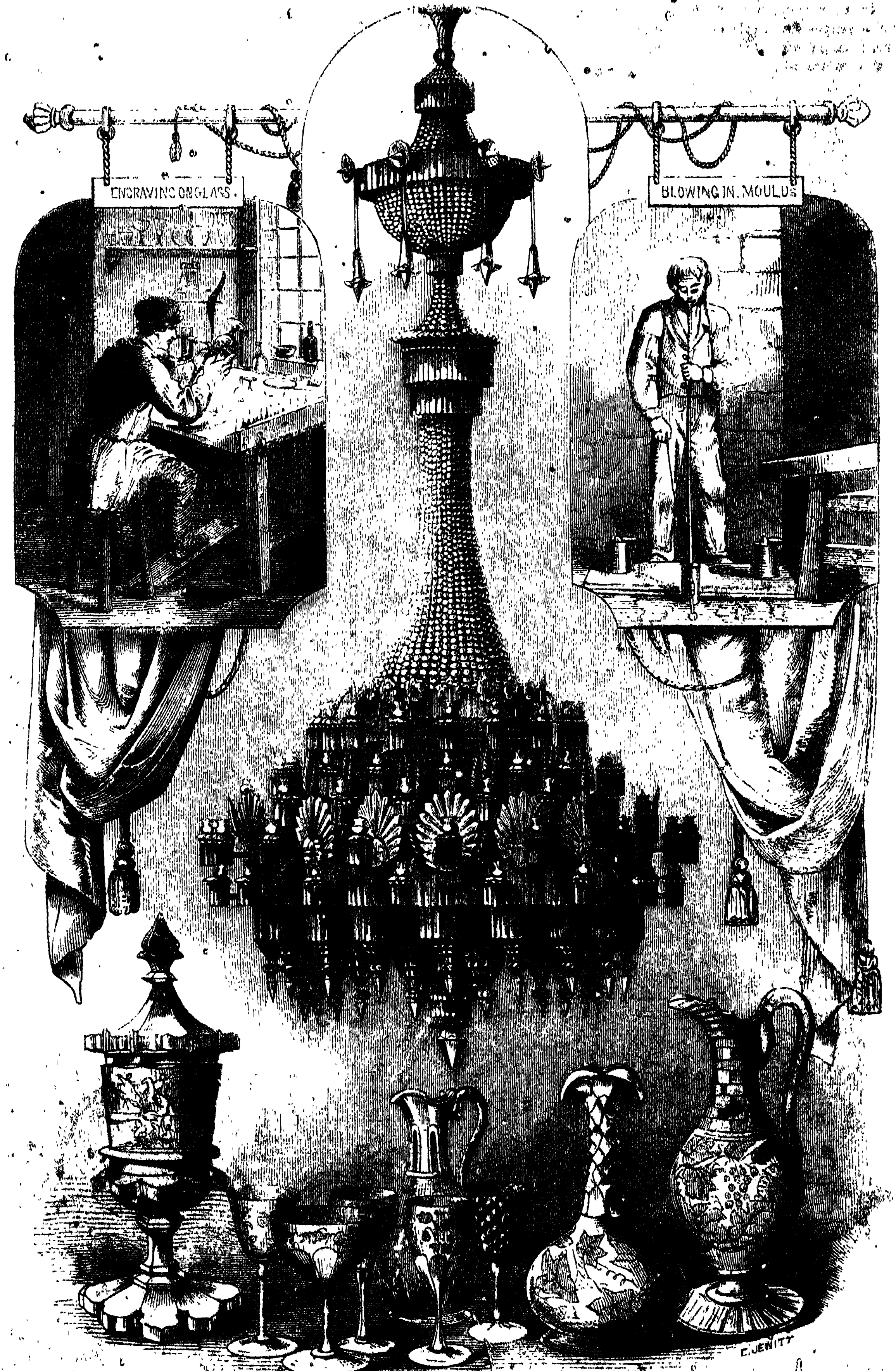
an effect is produced in decanters, drinking-glasses, chandelier-drops, scent-bottles, salt-cellars, toilet appliances, &c., similar to that of cutting, the interior being smooth, while the outer surface is corrugated, or ornamented with a pattern. This kind of object requires a mould about one-third smaller than the article required. A gathering is taken in the ordinary manner, and, after being allowed to partially cool, a second gathering is taken over the first, and the two, as hot as possible, are pressed into the mould;—the outer coating only receives the impression, and the interior is inflated by the breath of the workman. Being afterwards re-heated several times, the object obtains the proper fine polish. The foot is attached in the ordinary manner. In this way are produced those cheap domestic utensils, which, though much inferior to cut glass, are still very handsome. This sort of work receives its name from the fact that these projecting pillars are proved to have been known to the ancients, some Roman specimens lately found in the city of London being so formed.

Considerable quantities of pressed or moulded glass are sold in London and the principal towns, in the shape of drinking vessels, decanters, ornaments for candlesticks, &c. It is, of course, much inferior to cut glass, both in quality and appearance, but its extreme cheapness has rendered it available for numerous purposes for which glass had not been hitherto used; and so popular has it become since the reduction of the duty, that what was before a comparative luxury, has happily become a necessity, in the houses of the humblest cottagers. Pressed glass was, we believe, first made in the United States, but it is now manufactured in considerable quantities in the manufacturing towns of the North.

The ductility of fused glass is nowhere so observable as in the

TUBES FOR THERMOMETERS, &c.;

the making of which is extremely simple, and requires little more tact and nicety than is observable in other processes. A gathering is taken up by the workman, who rolls it on the iron-faced table till it has assumed a cylindrical form; he then blows lightly into it, to form the cavity within; and holding it towards another workman, who attaches a hot iron to the other end, the two men walk backwards, the glass elongating as they recede, till the required length is obtained. In this way a tube of between sixty or seventy feet is sometimes drawn out. At first the glass drops in the centre, as a cable does from the ship to the shore; but as it cools, and the men cease to turn it round, it assumes, by continued tension, nearly a straight line, except at the extreme ends, and is of an uniform bore throughout. It is then allowed to cool on the wooden rounds of a ladder placed on the floor, and the enlarged ends cut off with a steel file. If a simple cane, or solid thread of glass, is required, of course no blowing is necessary. In fact, the process of glass-drawing is exactly similar to the tricks we have most of us played in our youth with a bit of glass in the kitchen-fire. The mercurial column in thermometers is generally seen flat, while the outer surface is round; this effect is produced by flattening the tube before it is blown out, and afterwards re-dipping the mass.



GRAND CUT-GLASS CHANDELIER, AND GROUP OF OBJECTS, MANUFACTURED AT MESSRS. PELLATT AND CO.'S GLASS-WORKS.

In this way nearly all the tubes for meteorological, optical, and other purposes, is produced. Flint-glass possesses, at the working heat, a degree of tenacity and ductility not to be found in any other substance in nature. The exhibition of glass-workers at fairs, &c., is conducted on the principle of tube and cane-drawing; though the blow-pipe, instead of the furnace, is the melting medium.

CATHEDRAL OF EVREUX (NORTH SIDE).—*See page* 79.

Various curious and highly-interesting objects are made at the works of Messrs. Apsley Pellatt and Co.; such as—the Venetian Ball, which is a collection of waste pieces of fillagree-glass, collected together and packed in a mass of the most transparent flint-glass; the *Mille-Fiore*, or star-work of the Venetians, by which the ends of coloured-glass cane are arranged in a pattern and covered with a transparent surface; mosaic work, in which exquisite designs in arabesque are formed of threads of glass ranged vertically side by side, agreeably to a previously-formed design, of the Venetian diamond-moulded glass, which is produced either in a mould or by making a "pillared" surface to the object, and "pinching" the pillars together with the pucellas at certain determined distances; the cased glass used for toilet and scent bottles which is produced simply by a double gathering of fused glass, the outer one of which is ground off in a pattern, so as to show the glass beneath; the Venetian frosted glass, the cracked appearance of which is produced by suddenly plunging the object into cold water while at a red heat, and afterwards re-warming it at the pot's mouth, so that, while the outer surface appears as if it was cracked in a thousand places, the bottle or glass is perfectly sound. The philosophical toys known as "Prince Rupert's Drops," and Bologna phials, are made in the same manner. The exterior becomes cooled by the sudden contact with the water before the interior has had time to contract in a similar degree. The state of tension, therefore, is such, that the slightest scratch with a pin reduces the object to a thousand fragments.

Glass for optical purposes is made of the very best materials, it being necessary not only to preserve the lenses from *striæ*, or wreaths, but to render them as clear, brilliant, and colourless as possible. It appears that English manufacturers have not yet attained perfection in the production of optical glass, and that M. Guinnard, of Geneva, and some one or two French manufacturers, have made the finest specimens. Those of our readers who noticed the illuminating powers of the two light-house lanterns at the Great Exhibition, could not but have remarked the superiority of the one exhibited by Mr. Wilkins, of Long-acre, the glass for which was manufactured in France. Optical glass of large size is not, we believe, made by Mr. Apsley Pellatt.

All glass is liable to fracture unless it is cooled by degrees; for this purpose, as soon as any article leaves the hands of the workman, it is taken up by a boy, by means of a fork or a pair of wooden tongs, and carried to

THE ANNEALING OVEN.

Flint-glass, owing to its peculiar crystalline structure, must be carefully cooled. If glass were allowed to cool in the open air, it would contract unequally, and be therefore more liable to crack. To obviate this, it is cooled by a very ingenious method, being gradually and almost insensibly drawn from a heat only less powerful than that of the furnace where it was fused, to the atmosphere. The breaking of common drinking-glasses on the application of hot water is owing to insufficient annealing. We have before mentioned the annealing arch; let us now see what sort of a place it is. A glance at the engraving (page 57) will convey an idea of the exterior; but of its interior we must know something more. Well, then, the "lear," as it is called, consists of an arch or oven open at both ends; at the hot end of which the objects to be annealed are received, and at the cool end of which they are discharged. There are two semi-cylindrical arches, partly closed by iron doors, the purpose of which is to make the openings larger or smaller as required; for it is important that as little cool air as possible should be admitted to the oven. On the floors of these two arches, which are sixty feet in length, are placed iron pans to receive the goods, which travel backwards and forwards on a miniature railway, worked by an endless chain. The farther the arch recedes from the furnace the cooler is the air; and at the end the goods are received in an air-tight room. Different degrees of heat are kept up in each lear or arch, the hottest being intended for goods which are afterwards to be cut, and the coldest for ordinary table-glasses, phials, lamp-glasses, &c. The time required for annealing the newly-made goods varies from six to sixty hours; and the very best arrangements for annealing, or cooling, may be frustrated, should the glass-blower have in any way neglected his duty—lost time, for instance, in finishing his work—as the hotter the article enters the arch the better. For this reason large articles, such as globes, decanters, &c., are re-heated, when finished, at the mouth of a pot heated by beech-wood, called the "glory-hole." Great losses occasionally accrue from breakage, should too much atmospheric air be admitted to the arch; the direction of the wind, or the sudden opening of a door or window, having frequently done incalculable damage. To work the annealing oven advantageously, it is generally arranged that goods of a similar character shall, if possible, be made about the same time, so that the same fire may serve for all; or the railroads are made to travel at different speeds. The visitor will have noticed beside the mouth of the annealing arch, which glows with a dull radiance at a little distance from the furnace, several iron handles *outside* the building. These were used, in the days of excise supervision, to draw the goods from one end of the arch to the other, the exciseman keeping the key of the receiving-room at the extreme or cool end. In those days, the goods were taken from the pans, and, if found perfect, were weighed for duty, twopence being exacted for every pound of manufactured flint-glass. Much to the satisfaction of the glass-maker and the benefit of the public, the surveillance of the exciseman, which was not confined to the lear, is at an end and the duty on glass repealed.

As far as the process of glass *making* is concerned, our visit is over. Let us now, therefore, go to

THE GLASS-CUTTING ROOM.

The engraving (page 56) will furnish a good general view of the glass-cutter's wheel and apparatus: a part only of the glass-cutting room is shown, some forty such wheels, for different kinds of work, being in operation, all of them driven by steam-power. The wheels are of different sizes, and are capable of being stopped or put out of gear at the will of the workman. The cutting, or rather grinding, of glass utensils, is too well known to need much description. A cast-iron wheel has sand and water dropping from the hopper while revolving in a lathe. The workman takes the object to be ground in his hands, and, holding it against the edge of the revolving wheel, grinds it down to the required distance; and such is the dexterity acquired by practice, that one man will cut a thousand drinking-glasses, not one of which will materially differ in appearance from the other. The object is held in various positions, so as to produce the pattern required, care and accuracy of eye being the only guides for the worker. The iron wheels, with sand and water, are required for the first grinding; stone wheels, with rotten-stone and water, for smoothing the rough surfaces; and wooden wheels and putty-powder for the final polishing. In this simple way were produced all those fine cut goods shown at the Exhibition by Messrs. Pellatt, and for which they received a prize medal. In another room are ground the stoppers for decanters and "doctors' bottles," the importance of which last being well made, is known to all chemists and experimentalizers.

With a glance at the operations of

THE GLASS ENGRAVER,

our visit, already somewhat too long, must be brought to a close The antiquity of engraving on glass is unquestionable; the Portland Vase, and many specimens of Venetian workmanship attesting the skill of artists now known no longer. Engraving on glass must be really considered a branch of the fine arts, so delicate and curious are some of the effects produced. The workman sits before a small lathe worked by the foot; and, by means of a series of various-sized copper discs and a little emery powder moistened with oil, he produces those elaborate and highly-finished designs so much valued. The glass engraver is a workman of the highest class, possessing a good knowledge of the forms of natural objects, a strictly refined taste, and a delicacy of hand and eye unsurpassed by the labourer in any other department of manufacture. For the general effect, as far as a wood engraving can give it, of the finished articles furnished at this establishment, we must refer to the engraving (page 72). Words fail in describing what can only be appreciated by the eye.

A few words, and we have done. There is, perhaps, no employment in which so much nerve and steadiness is requisite as in that of the glass-maker. The workman, however rough his exterior, and unpromising his aspect, is in some respects an artist; for without taste and a capacity to improve, no man becomes a good glass-maker. In spite of the heat of the factory, the labour of the glass-maker is not unhealthy. The limbs and the lungs are both exercised, and many old men may be found in the glass-maker's chair. In conclusion, we are glad of this opportunity of thanking the proprietor of the works we have visited; and, should any of our readers wish to see the whole process for themselves, we are certain they will receive a *warm* reception at the Falcon Glass Works.

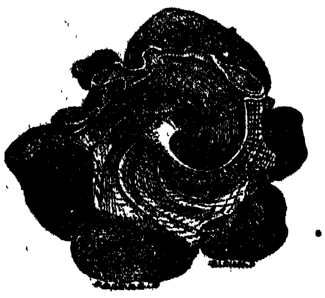
THE SCIENCE OF SHELLS.

SHELLS are frequently regarded as attractive objects, but they are worthy of far more attention than they usually receive. In form they exhibit an almost infinite variety. While some consist merely of a simple tube, or a hollow cup, others present the most graceful convolutions, and appear in the form of cones, spires, and turbans. The useful, too, is suggested, no less than the beautiful; for there are shells shaped like a box, with every variety of hinge, from that of simple connection by a ligament, to the most complicated articulation. So various and elegant, indeed, are the forms of shells, that Lamark strongly recommended them to the study of the architect. "There is scarcely any possible form," he says, "of which nature does not here supply examples;" and he specifies certain shells which would supply a choice of models for the ornaments of columns, and which "are highly worthy to be so employed." In England, however, no such recommendation is necessary, as many of our beautiful stucco ornaments, particularly for chimney-pieces, are copied from shells, and are greatly admired.

The colours of shells are often so intensely vivid, so finely disposed, and so fancifully variegated, that, as objects of beauty, they rival many choice productions of the animal and vegetable kingdoms, and in some respects exceed them. How feeble an impression do we receive from a *Hortus Siccus*, compared with that which is produced by the living plants and flowers, attired in beauty, and breathing forth fragrance; and there is a vast difference, notwithstanding all the skilful efforts of art to diminish it, between the animal living and dead. The shell, however, retains not merely the form, but all the brilliant hues it had in its own native waters. And then, whatever care may be taken to preserve a quadruped, a bird, a fish, or an insect, as a specimen for the cabinet, such objects suffer by changes of atmosphere, while various minute creatures attack and destroy them. With shells it is not so. Composed of particles already in natural combination, they contain no seeds of dissolution, and the collection made by the parent may be handed down to the child, and by him transmitted, in all its pristine beauty and durability, to the remotest generation. We shall, therefore, give two or three articles descriptive of shells, and also of their inhabitants, accompanied by numerous and beautiful illustrations.

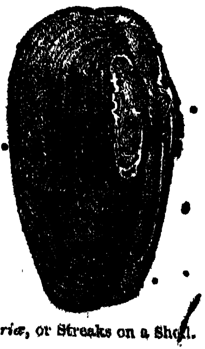
The materials of a shell are supplied by an organised fleshy substance, often termed the "skin," but now known as the "collar," in shells consisting of one piece, and by the margins of the "cloak," or "mantle," of the animal, in those of two pieces. They consist of particles of carbonate of lime, and of an animal substance, resembling, in its chemical properties, either albumen or gelatine. An easy experiment will illustrate their structure; for, if diluted nitric acid be poured on a shell, or a piece of one, placed in a glass vessel, there will soon be thrown off a soft floating substance, which is, in fact, the animal part of the shell, retaining its precise figure, and consisting of net-like membranes. As thin, earthy particles are secreted for the purpose, and perspired through the vessels of the animal, they gradually incrust these meshes, and the shell is formed.

Fig. 1.



Shell strengthened by the accretion of other substances.

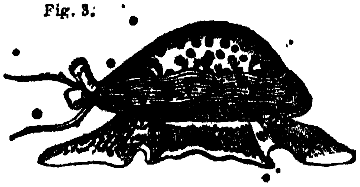
Fig. 2.



Striæ, or Streaks on a Shell.

The process of formation itself may be distinctly observed. Let a piece be removed from the shell of a living snail—which may be done without the slightest injury, as the shell adheres to the body at only one point—and in the course of twenty-four hours there will be formed a fine spider's-web-like pellicle, which, stretched across the vacant space, becomes the first stratum of the new piece. In a few days it will be found increased in thickness, by layers added to its inner surface; and such additions will be continued, until, in about ten or twelve days, this web-like substance has acquired nearly the same thickness as the rest of the shell. Its situation, however, is not exactly the same, for it is beneath the level of the adjacent parts. As their fractured edges remain unaltered, it is evident, therefore, that they have no share in forming the new piece, and it is equally so that the materials must be supplied by the little creature within. Could any doubt exist as to this, it must be obviated by one of Reaumur's experiments. He introduced, through the opening made in a snail's shell, a piece of leather all round the circumference of the broken edges, so as to lie between the shell and the mantle; and the result was, that no shell was formed on the outside of the leather, while the inner side was lined with the secreted substances. The calcareous matter, as it exudes from the mantle, is fluid and gelatinous, but it soon hardens into shell.

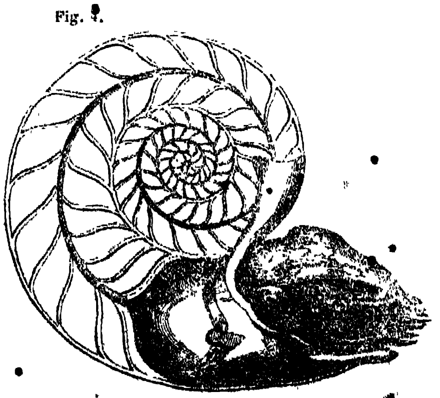
Fig. 3.



The Cypræa.

Some shells, more uniform and compact in their texture than others, are called *porcellaneous*, from their resemblance to porcelain. In such instances the animal matter is more equally blended with the earthy particles, and, like a cement, binds them strongly together. The carbonate of lime, too, assumes more or less of a crystalline arrangement. Sometimes the particles have the shape of *rhombs*, and are composed of three distinct layers, each of which is formed of very thin plates, marked by oblique lines, which show the direction of the crystalline fibres, so arranged as to give strength to the shell, and that on a principle which has latterly been applied to the building of ships. In other cases the crystals are *prismatic*, generally hexagonal, and the fibres are short. So perfect was the crystalline appearance in a shell, brought from Sumatra, that some fragments of it were actually mistaken for a mineral production. Certain animals, which fix themselves to rocks, and whose shell has too little solidity to resist the shocks to which they are frequently exposed, obviate this weakness by doubling the outer surface of the shell, from a bed of stones, or from fragments of other shells, and similar substances. This precaution, which has given them the name of masons and brokers, shelters them from the shocks they would otherwise endure, and serves them, also, to deceive the eager eye of the fish which seeks for them, and which can only perceive the substances they thus employ. The broker shows little symmetry, but much art, in the construction of his second shell. The mason, on the contrary, arranges his stones symmetrically, and in

Fig. 4.

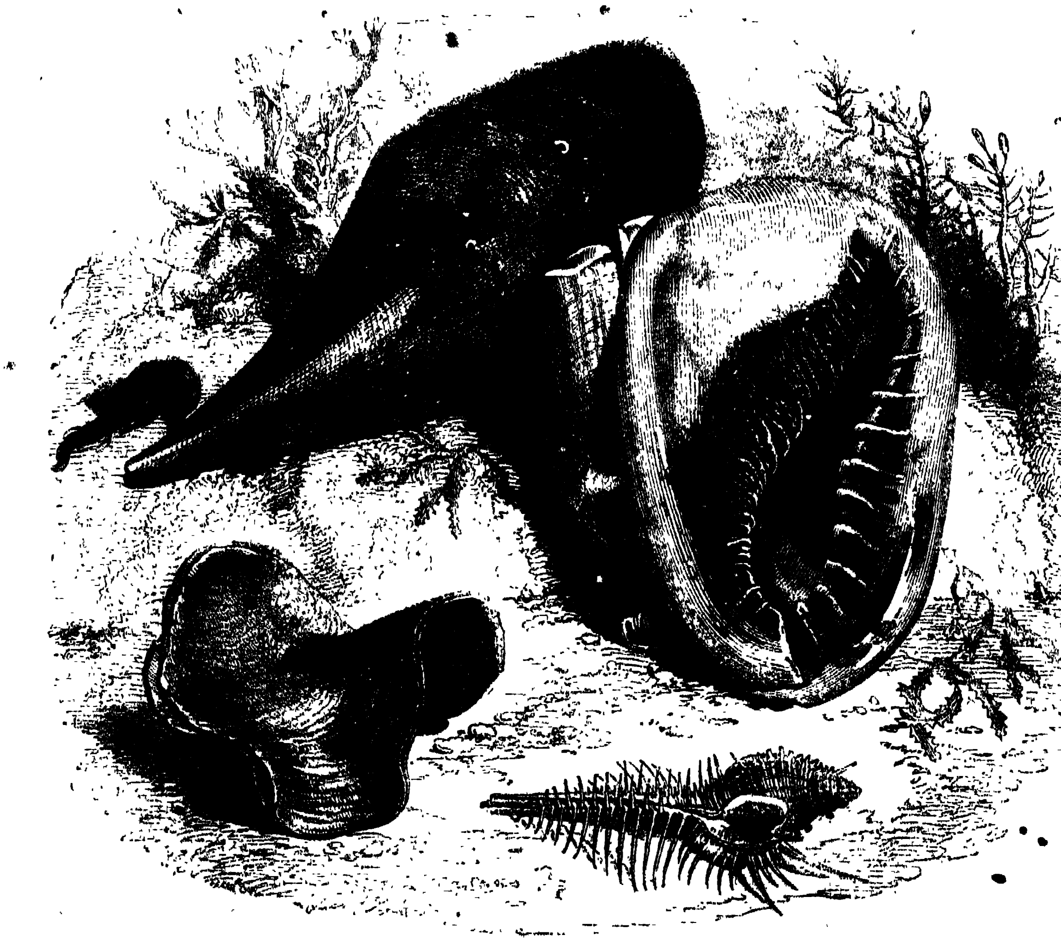


Chambered Shell of the Pearly Nautilus.

a regular spiral, in beginning by the little flints which occupy the centre, the summit of the shell, and in finishing the structure with the larger pieces, which can cover and mask the opening.

The shell of the Nautilus is not simply hollow: if a section be made of it, it will prove to be divided into numerous regular chambers, the last, or largest of which only, encloses the body of the animal. A tube, partly shelly, and partly membranous, traverses these various apartments, and is continued into a cavity on the body of the animal, which, freely communicating with the branchial cavities, and receiving water from them, can, by its contraction, transmit that element through the tube into the chambers of the shell.

These chambers are said to contain air generated by the Nautilus, and, being thus filled with a fluid more buoyant than water, they enable the animal to float, notwithstanding the density of the shell; but when the animal wishes to sink, it forces water through the tube, thereby compressing the air, and immediately becomes heavier than the surrounding medium. What an admirable arrangement is this! It enables the Pearly Nautilus to float at pleasure on the surface of the deep, enjoying the light and warmth of the sun; and, should danger threaten, instantly to sink to the bottom of the sea, and there to rest perfectly secure. The engraving presents a section of the chambered shell, with the animal in its last compartment. The dark line shows the course of the tube. (Fig. 4.)



Large Shell from the Mediterranean, with its byssus.—Helmet Shell from Madagascar.—Shell from Malabar.—Fine-thorned Murex.

A great number of shells present *striæ*—streaks, or fine thread-like lines—which indicate the successive additions made to the shell.

The edge of the opening of shells is more or less completely formed, and exhibits, in some species, during their early state, a thin and fragile lip, which thickens with age, and forms often a sort of border.

The various and often splendid hues of shells are to be traced to glands situated on the margin of the collar or mantle, for the purpose of depositing colouring matter. In many instances, an accordance has been marked between the patterns, or tracings on the shell, and the colours as arranged in the organ that secretes them. In the Banded Snail, for example, there are just as many coloured spots on the edge of this organ as there are zones on the shell; and if a part of the margin of the shell be removed, the piece reproduced is brown opposite to the dark portion of the organ, and yellow in other parts.

The glistening, or silvery appearance, which some shells exhibit on several parts of their inner surface, is caused by the peculiar thinness, transparency, and regular arrangement of the outer layers of the membrane, which, with particles of lime, enter into their formation. To this combination has been given the name of "mother-of-pearl," from the idea that it was the material of which such gems are formed. But, though it is true that pearls are actually composed of the same substance, yet these bright colours are proved to be the effect of the light falling on the parallel grooves that arise from the regular arrangement in the successive deposits of the shells. This is placed beyond all doubt by the fact, that, if an accurate impression of the surface of mother-of-pearl be taken in shell-lac, sealing-wax, fusible metal, or gum-arabic, each of these substances will acquire the same iridiscent property.

A beautiful provision for the security and comfort of the animal remains to be noticed. When the inhabitant of a spiral shell retires within it, the part of the body situated at the mouth of the dwelling would be exposed to injury, but for this peculiar and admirable defence. The animal is, therefore, prepared to construct a separate plate of shell, just adapted to fit the aperture, and called an *operculum*, or lid. In some instances this plate is attached to the shell by an elastic spring, so that the plate may either close or open the entrance as occasion requires.

A temporary partition, which is sometimes formed, answers its purpose equally well. Thus, when winter approaches, the garden snail prepares itself for passing that season in a torpid state, and for this purpose it chooses a safe retreat, retires completely within its shell, and then forms a plate for its defence. It afterwards constructs a second partition, placed more within, and a little distance from the first. When, for the sake of experiment, while the snail is in full vigour, at any other season, it has been surrounded with a freezing mixture, the snail sets about its defence, and in an hour or two accomplishes its task. When the genial warmth of spring penetrates its abode, the snail secretes a mucous fluid, which loosens the adhesion, and the plate is thrown off by the pressure of the foot. The shells in the engravings on the opposite page, with the exception of the one at the top, are *univalves*, or those formed of one piece. The Helmet-shell, just below it, is one of a tribe employed by artists for the fine sculptures which they call shell cameos. They even form, in consequence, an important branch of commerce. The shell lower down, to which the French have given the generic name of "Placune," as very slender, is of the species employed in all the churches of Goa, on the coast of Malabar, but more rare, and of a brown colour. The Murex is a pretty shell, common in the seas of China, but often difficult to discover, because of the thorns that beset it, and which at the extremity, are long and abundant.

The *Crown Volute* (on this page) is one of the largest of the univalve shells; it is brought from the Philippines and Moluccas. The *Imperial Volute* is more rare, and highly valued on account of its beauty; its name is owing to the crown of points which adorn its anterior extremity; its common name is "the Crown Imperial." Certain of the mollusca have the singular property to collect about them all the bodies that are near, often attaching to themselves little shells, of which an example is given in the *Trochus agglutinans*, common in the Antilles, and sometimes found in the Indian seas. Another *trochus*, presented to view, from the seas of New Holland, has not this agglutinating property. The last figure on this page exhibits the *Pholas*, of which we shall give a more particular description at another time.

Shells, of which a brief, but, it is hoped, interesting and instructive account has now been given, beautiful and varied in themselves, acquire a fresh interest when regarded as the habitations of living beings. These are the animals usually termed *molluscous*, or the *mollusca*. The term is derived from the Latin word, *mollis*, soft, and denotes those creatures which have not the hard covering common to others. Such are snails, oysters, and mussels. The simplest name they bear is that of *mollusks*.

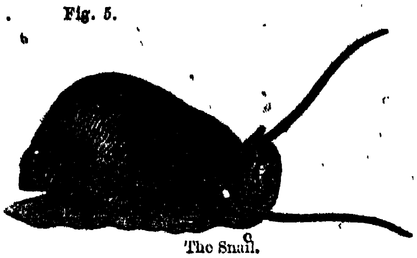
The bodies of mollusks, notwithstanding their softness, are composed of organs, which may be easily distinguished, and exercise divers functions. Thus we may observe their muscles, often numerous, their digestive tube and its accessory parts, their nerves, and their systems of circulation and inspiration, both of water and of air. If, however, the more complicated of them seem, in some degree, to approach to fishes, it is necessary to remember that the difference between these two divisions of animated nature is great and unalterable.

Crown Volute.—Imperial Volute.—Trochus Agglutinans.—Trochus, from the Seas of New Holland.—Pholas.

Some mollusks have a distinct head, and are designated by a corresponding name, CEPHALA. Others have no head apparent, and their headless state is denoted by the term ACEPHALA.

Their skin, more simple in its construction than that of vertebrate animals, is always soft, and covered with a viscous matter, which the animal secretes. It is very sensitive, and more or less smooth, and by its means, whenever the creature is disquieted, it can withdraw itself into its shell. Sometimes the mantle presents one or two openings, of some prolongations, called *siphons*, which extend more or less beyond the shell, and may also be retracted. They are terminated at their opening by a crown of papillæ, somewhat like the small protuberances on the human tongue, through which passes the water necessary for the mollusk. The siphons serve also, in part, as instruments of touch.

Fig. 5.



The Snail.

Fig. 6.

The Snail's Journey.

The thickness of the mantle varies greatly, as it does in other respects. Its edges are simple, divided, or fringed, and sometimes provided with appendages, more or less developed. The secreted matter is more abundant at certain epochs, as appears from the form of shells like that in the engraving (Fig. 10).

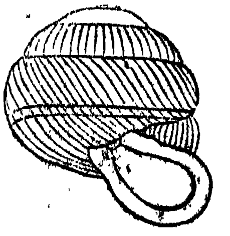
The shell, in some of these creatures, is composed of two pieces, called valves, which have one or two principal muscles, situated at the extremities, or at the centre of the pieces. By their contraction, these muscles are in constant antagonism with an elastic ligament, forming a hinge or turning point, designed to separate the free edges of the valves, and to act as a spring which shall bring them close together, and then be at rest (Fig. 9).

The remarks now made on the muscular system apply only to those animals whose shells are composed of two pieces, and which are, in consequence, called *Bivalves*. The others, of which the shell consists of one piece, are denominated *Univalves;* and those especially, which have arms, have more numerous muscles still, which are indispensable for the movements of their organs; and it is necessary that there should be a special and powerful muscle, that the animal may retire into its shell, which is often deep and spiral. There is also a species in which the shell is formed of many pieces, hence called *Multivalves;* and which, therefore, have muscles adapted to the movements of each one of its parts.

Some mollusks are firmly fixed to the rocks, by a calcareous exudation from the shell; and clusters are often thus cemented together, forming greater or smaller masses. Others attach themselves to the rocks by a cable or byssus, of which we have a familiar example in the mussel. This cable consists of threads, which exude in a glutinous state from one of the organs of the mollusk at the base of the foot (Fig. 14).

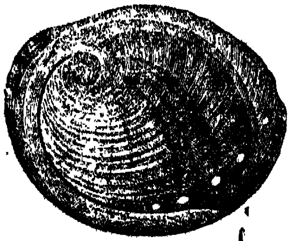
The mouth of mollusks, of which the form is various, is not always very visible, although it exists in those mollusks whose head is not distinct. It presents, generally, a little longitudinal or transverse furrow. In many, no trace is found of teeth; others have jaws which are horny, and provided with teeth. The mouth is composed, in some species, of a ring, of which the borders are fringed; in others, it appears at the centre of a semi-circular hood.

Fig. 7.



Univalve.

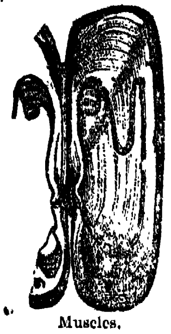
Fig. 8.



Bivalve.

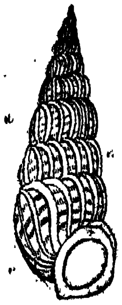
Various means are also provided for bringing food to the mouths of these creatures. Some have, for example, a proboscis, which may be observed stretched out to grasp some prey; and at others it pierces the shells of other mollusks, to suck out the flesh of their inhabitants. In some instances, the lips of the proboscis are furnished with strong hairs.

Fig. 9.



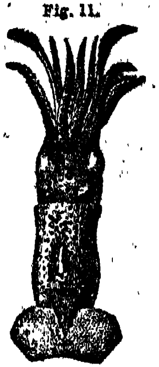
Muscles.

Fig. 10.



Spire-like Shell.

Fig. 11.



Mollusk, with a head

The stomach is often in the head of mollusks; in some it is simple, and in others complex. In some species it is enveloped with muscles so very thick, that they have been compared to those of the gizzard of birds. In the headless mollusks, the stomach is, so to speak, only a cavity in the tissue of the liver, which secretes readily and abundantly the bile necessary for digestion; while in the mollusks, that have heads, the liver is always distinct and separate from the stomach, which it sometimes envelopes. The intestines are also enveloped by the liver.

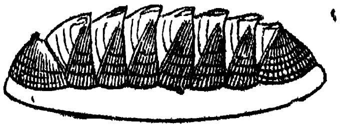
The process by which the food is converted into chyme has not been satisfactorily traced. The blood is white, or, rather, of a bluish colour. The circulating system of mollusks exhibits very remarkable differences in the different classes, but in all of them there is a ventricle; though the other parts of the heart are not of constant occurrence.

Those which respire by means of lungs are few in number, and form a very natural tribe. In them the respiratory organ is simple, consisting of a single cavity, in the walls of which the extremities of the pulmonary artery are spread. This cavity communicates externally by an aperture which the animal can open or shut at pleasure.

Those which breathe by means of gills exhibit very remarkable differences in their number, structure, and position. In some cases there is a single cavity communicating by an aperture, through which the water enters. The walls of this cavity exhibit an uneven surface, dispersed in ridges, which are the gills, and on which the pulmonary artery is expanded.

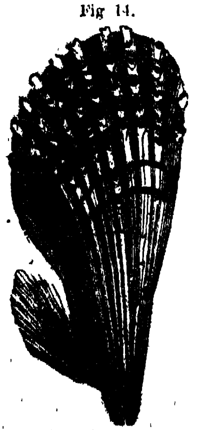
In mollusks, the nervous system is less complicated than in the higher classes, and the brain is not restricted in its position to the head. It appears in the form of ganglia, or tumours and filaments.

Fig. 12.



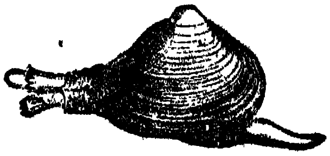
Multivalve Shell.

Fig. 14.



Byssus for the attachment of a Shell.

Fig. 13.



Siphons of a Mollusk.

The principal ganglion, to which the term brain is usually applied, is seated above the gullet, or entrance to the stomach. It sends out nerves to the parts about the mouth, the arms, and the eyes.

The head of a number of mollusks is surmounted with fleshy appendages, depending from the skin; a species of arms, which partially resemble those of insects. They have received the name of arms, and are special organs of touch. They are endowed with extreme sensibility, and readily contract, like those of a snail.

In other instances, the arms are more or less long, and numerous; they are furnished with suckers, by means of which the animal fixes itself to a body, and then holds it firmly.

(*To be continued.*)

THE CATHEDRAL OF NOTRE DAME D'EVREUX, IN NORMANDY.

(*See Engraving, page 73.*)

At the Cathedral of Notre Dame d'Evreux, a strange custom anciently prevailed, which was called the ceremony of St. Vital. On the first day of May, in each year, the chapter went in procession to a wood near the town, called the Bois-l'Eveque, and cut off branches from the trees with which to adorn the images of the saints. At first the canons themselves went in person, but afterwards they sent the choristers instead; then the chaplains of the cathedral joined in it; and, last of all, the curates of the parish. It was called the "Black Procession." The choristers, who regarded the whole affair as a good piece of sport, wore cassocks and square caps, and were preceded by the boys of the choir, the apparitors, and other servants attached to the cathedral, each with an axe or pruning-hook in his hand, for the purpose of cutting down the branches. On their return, they pressed the country-people into their service to carry back the boughs to the church; and as they held them elevated over the heads of the party, it had very much the appearance "of Birnam Wood coming to Dunsinane." In the meantime the church bells were kept loudly ringing, to let all the neighbourhood know that the ceremony was being performed, and that May had begun.

Upon one occasion, however, the bishop forbad the ringing of the bells, but the choristers drove out the sextons, and kept the gates locked during the four days of the ceremony, ringing all the time with all their might. Two of the canons climbed up from the chapter-house to enforce the bishop's orders, but they were immediately seized, and ropes being passed under their armpits, they were allowed to hang from the windows of the tower in this position for a whole day. This occurred about the year 1200.

The "Black Procession" was the occasion of many abuses, and gave rise to all sorts of extravagancies. They made a practice of throwing bran in the peasants' eyes whom they met on the way, and made some leap over a broomstick, whilst the others danced. Afterwards they began to wear masques, and the *fête* formed part of the "*Fête de Fous*," or Fool's Festival. The choristers having returned into the church, took possession of the stalls of the canons, who then took to flight, and went to play at skittles, sing, and dance in the vaults.

A canon named Bouteille, who lived about the year 1270, left money for an *obit* or service for the repose of his soul, on the 28th of April, the day on which the *fête* which we have just been describing began. He bequeathed a large sum to be distributed amongst the canons, chaplains, choristers, and others, who might take part in the service; and he desired them to spread on the floor of the church during its performance a large pall, upon the four corners of which there should be laid four bottles of wine, and a fifth in the middle, the whole for the use of the singers in the choir. This curious testament caused the name of the wood to which the Black Procession went to cut the branches to be changed from "*Bois l'Eveque*" to "*Le Bois de la Bouteille*," or "Bouteille's Wood."

To preserve the wood from total destruction, an arrangement was afterwards made by the bishop, by which some of his own servants were commissioned to count the number of persons taking part in the procession, and having cut down one branch for each, to distribute them at a cross which stood upon the road-side close at hand. During this distribution they drank and ate a sort of biscuits called "jaw-breakers." The bishop's guard, before anything had taken place, made near the place two figures resembling a bottle, and buried them in the earth, filling up the hole with sand, in memory of the founder of the *obit*, Bouteille (*bouteille*, a bottle).

These strange facts are related by a priest, writing in the *Mercure de France*, in 1726. The cathedral, however, is more remarkable for the great beauty of its architecture and its sculptures than the singularity of its historical reminiscences. It has been so many times laid in ruins, that it is now impossible to form an idea of what it was originally. It was destroyed by Henry I. of England in 1125, but he ordered it to be rebuilt in a style of so great magnificence, that an old French chronicler declares that it was the most beautiful of all the churches of Normandy. It does not appear, however, that it was entirely reconstructed by Henry; some of the arches of the nave appear to have been built in the time of William the Conqueror by Bishop Gislebert. The nave was completely restored by Robert de Roie, Bishop of Evreux, in the time of Philip Augustus.

The choir and the parts adjoining were rebuilt by the contributions of King John, Charles V., and the bishops and counts of Evreux, after the devastations inflicted by the English. Louis XI. placed in it the lantern and bell, called "the silver bell," from the sweetness of its sound. To him also are due the transept on the southern [illegible], the chapel of the Virgin, the sacristy, the vestry, the repairs of the library, the galleries of the choir, and the arches which surround them, the cloister, the ornaments on the sides of the nave, and the pillars opposite the chapels.

The northern front, which is represented in our engraving on page 73, and the greater part of the large tower, were built by Bishop Ambrose. It was completed in 1636, by means of a legacy bequeathed to the cathedral by the Sieur Martin, a chaplain and notary apostolic. About the year 1608, Henry IV made a gift of 4,000f. to hasten its completion. The southern tower was built about the middle of the fifteenth century.

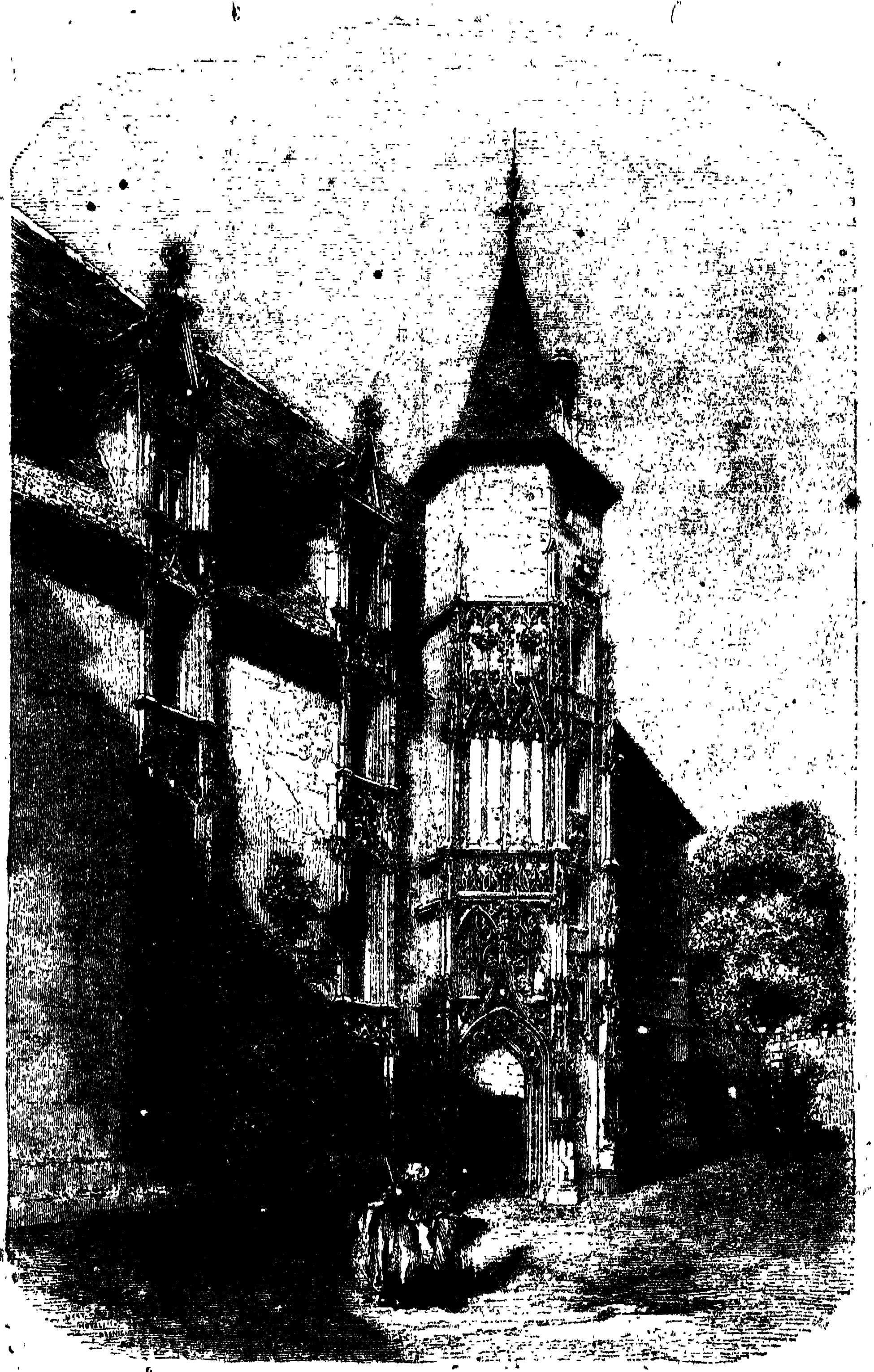
Before the revolution there was a statue of Henry I. of England, holding in his hand a roll of parchment, to commemorate the donations made by that prince to the bishop and chapter, of the churches and tithes of Verneuil and Nonancourt, and of the lands and barony of Brandfort in England.

Sculptures in wood of exquisite workmanship adorn various parts of the church, particularly the ceiling of the vestibule, which is divided into compartments, filled with foliage, figures of birds, and flowers, in a style of great chasteness and delicacy. On all th[illegible]els, the great gates which stand at the entrance to the choir, the wainscoting in the interior, and on the halls, groups of satyrs, of monks, crosiers, &c., meet the eye at every step, all executed in the first style of art.

The treasury is considered one of the finest pieces of smithwork in France. The gratings, bolts, and the padlocks of the gates, are wrought with extraordinary richness of design and beauty of finish. The stained glass windows are valuable, not only as works of art, but in an historical point of view. The oldest of them was put up in the fourteenth century, and the last in the sixteenth. They contain portraits of many of the bishops, of Charles the Bad King of Navarre, and of Louis XI. of France.

The see of Evreux formerly included 540 parishes and 11 abbeys, without counting a great number of collegiate churches, priories, and chapels. The bishop also possessed four baronies; one of the suburbs of the town of Evreux was within the limits of one of these, and the inhabitants were obliged to wear a small crosier embroidered or sewn upon their coats, in token of their vassalage. The bishop had also the right of taking part in the election of the principal of the college of Evreux, who was always a canon of the cathedral. The college was composed simply of five classes in *belles lettres*, and was exclusively in the hands of ecclesiastics.

When a new bishop came to take possession of the see, he set out for the cathedral from the abbey of St. Taurin. He was conducted by the clergy to his palace, and he there received his crozier from the hands of the canons, headed by the eight seniors, who took the title of barons, from their each possessing an eighth of the barony of Angerville. By the terms of his tenure, as a vassal of the see, the Lord of Feugnerolles was obliged to cover the road for some distance from the town with straw, on the day on which the bishop was expected to arrive. On a bridge

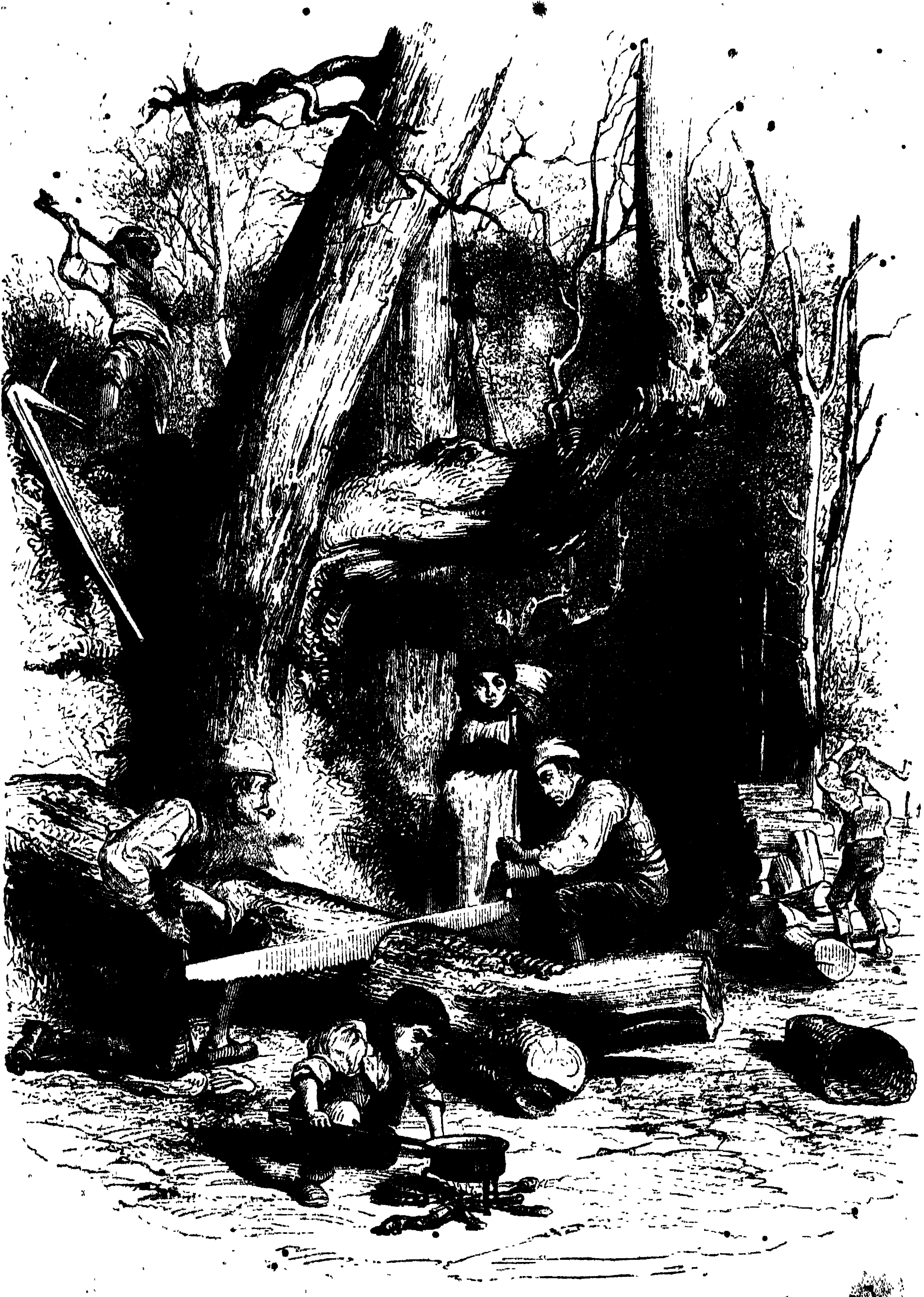


REMAINS OF THE BISHOP'S PALACE AT EVREUX.

n the vicinity the bishop received the oath of fidelity from him and the chapter, the seigneur swearing "to protect him against all his enemies, except the king." Having reached his official residence, the bishop gave a banquet to two hundred persons, at which the seigneur acted as cupbearer, presenting the bishop with a gilt silver cup, valued at four marks, which he always received as a present immediately afterwards. The episcopal palace, where Henry IV. stayed for some time in 1603, does not at the present day present anything worthy of remark, except the elegant sculptures which adorn the windows.

All these details throw some light upon the curious relations existing between the church and the people under the old *regime* in France; and, notwithstanding all that has been said on the other side of the question, there can be no doubt that, of all the abuses which the revolution of 1793 swept away, none was more deserving of censure or removal.

WOOD-CUTTING IN THE FORESTS OF THE ALPS.



THE woodsmen are, in this country, almost an extinct race. They have disappeared before the farmer. The splendid forests of oak which once covered our island, and afforded shelter to the deer, the wild boar, and the wolf, have vanished one by one, and the ploughman and his teem now slowly traverse the spots on which outlaws may have once feasted on venison in the "merrie grenewood," and washed it down with home-brewed ale. In a comparatively level country, like England, where the climate, though variable, is always temperate, life in the woods must have been at all times pleasant, though perhaps laborious. But in the elevated valleys of Jura, of Switzerland, and of Savoy, the great rigour of the winter, the badness of the roads, and the ruggedness of the soil, make wood-cutting a painful and dangerous task.

When the trees are growing on the side of steep inclines, or in the neighbourhood of precipices, it requires no small amount of courage and dexterity to fell them in such a manner that they may not fall to the bottom of the ravine and be lost. The approach of winter, also, is so sudden, that trees are often abandoned which have been already half-cut down. Often, when they have been felled, there is no time to saw or dress them, and the work must be left unfinished until the return of spring. But the labours of the hardy race who people the districts bordering on these wilds have not failed to produce their effect. Many of those vast slopes which, at the beginning of the present century, were thickly covered with pine forests, are now reduced to bare pastures, affording a scanty subsistence to herds of lean and wretched-looking cattle. Foreigners have purchased large tracts, the timber of which has been cut down and floated down rivers and lakes to the sea for exportation. The destruction of the trees not only injures the appearance of the country, but leaves the valleys exposed without shelter to all the fury of the north wind, and thus the growth of the crops in spring is retarded, and the snow and ice melt much more slowly. But perhaps the most important objection to the wholesale cutting of the forests is found in the fact that they were a never-failing protection against avalanches. It was rarely that one of these tremendous masses was able to force its way through the dense pine groves which lined the sides of the mountains; or, if it did, its progress was necessarily so slow, and the noise so loud, that the inhabitants of the villages were enabled to make their escape in time. But now that these trusty guardians are gone, they have been compelled to erect other safeguards, at great expense, by digging immense trenches, or embankments, and driving in huge piles and stakes. The inhabitants of many of the valleys are now reduced to the greatest straits, during the winter months, for want of firewood. In that of Urseren, near St. Gothard, briars and heather are now the only substitutes for the vast masses of pine that once crowned the heights all around. In many places, too, while the forests were in existence, the supply of rain in summer was regular and plentiful, but now that they have disappeared, the fountains are all dried up, and the people are obliged to preserve the water in cisterns with great labour and expense.

Land-slips are also every day becoming more numerous. The melting of the snow sometimes loosens the soil, and causes large masses to slip from the side of the mountain, carrying ruin into the valley beneath. Most of these catastrophes occur in consequence of the destruction of the trees, and the consequent decaying of the roots, which had given firmness and consistency to the clay and rocks on the mountain side. In one commune, in which the forests were cut down to leave room for the sowing of corn, the whole district glided down from the side of the mountain in this way, filling the inhabitants with terror and affright.

Travellers, who have seen in the beginning of the present century the forests of Engadine, of the valley of Calanca, in the Grisons—that of Habkeren in the canton of Berne, of Alpnach in that of Unterwald, and many others both in Switzerland and the neighbouring countries, would now be astonished at the wide-spread desolation of the scene.

The cause of these clearings is to be ascribed in the main to the want of wood, not for firing merely, but for the construction of houses, farm offices, &c., which of course frequently need repair and renewal, and are besides very liable to fire. At the same time no part of the world contains a better supply of stone for building; but as wood is a material more easily obtained, it is probable it will continue to be used until the last tree has been felled. The peasantry, with great want of foresight, never exercise the slightest economy in the use of fuel. Separate fires are frequently lighted at the same time in the houses of small farmers for several different domestic purposes, one for baking bread, another for drying fruit, and perhaps another for cooking the food. The prospects, therefore, of the people are anything but favourable. It is dreadful to contemplate the misery which may follow the total destruction of the forests, particularly as there is nothing to warrant the belief that coal can be found in Switzerland in quantities at all sufficient to supply the wants of the inhabitants. Attempts have been made by benevolent individuals to ward off the calamity by sowing new seed as fast as the trees are cut down, but no sooner has it been done than it has been all rooted up and scattered by the village children; and it is not by any means probable that any united effort will be made by the peasantry to remedy the evil until all effort has become useless.

Our engraving may give the reader a good idea of scenes of every-day occurrence in the forests of the Alps. The men of the family sawing, splitting, and cutting; the wife or daughter looking on with folded arms; while the little boy is warming the soup which he has brought for the woodsmen's dinner.

The labours in which the woodsmen are here engaged will furnish materials for employment in the long nights of winter, when everything out of doors will be cold, cheerless, and dreary. After a certain portion of each tree has been split up and stored for fuel, the remainder is cut into thin lathes and made into baskets, tubs, casks, &c., for sale in the neighbouring towns, and the task is lightened by joyous and lively conversation around the blazing hearth.

THE SCIENCE OF SHELLS.

(*Continued from page 79.*)

The state of a shell is entirely dependent on the form, position, and extent of the secreting organ. This is asserted in few words, yet what mysterious operations do they indicate! Let any one look at the immense variety of form which is apparent in a collection of shells, and the consideration that the differences are attributable to proportionate peculiarities in the size and the functions of the mantles covering their inhabitants, cannot fail to excite great astonishment, and to call forth admiration of the INFINITE WISDOM which is discoverable in them all.

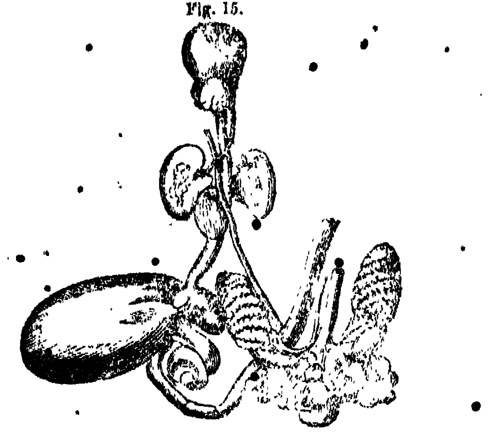
Even in the egg, the first shell of the little creature is formed. Its simplest shape is a concave disc. But it has to grow with the mollusk's growth; and for this the arrangement is perfect. It is easy to imagine the animal covered with its mantle, expanding the border of this organ, and stretching it beyond the edge of its dwelling the concave disc, for example—that it may form there a new layer of shell, which shall extend a little way beyond its circumference. It is the same with succeeding layers, each of which being larger than the one preceding, projects in a circle beyond it; and the whole series of these layers forms a compound cone, exhibiting transverse lines on its outer surface—a sort of calendar, in fact, of the successive additions made to the shell, exactly corresponding with the growth of the inhabitant.

It is also worthy of special notice that the apex of a cone is first formed, thus affording the protection that the minute creature requires on its extrusion from the egg. It may generally be distinguished from the parts afterwards formed by its colour and appearance. The succeeding turns made by the shell, as its inhabitant grows, enlarge its diameter as they descend, and form, by degrees, a wider base. As, too, the body extends towards the mouth of the shell, its posterior end frequently leaves the first turn of the spire, and takes up another situation, when the cavity is filled up with solid calcareous matter, as hard as marble.

The shell, whatever its form or character, is specially adapted to its inhabitant. If, for instance, the head of the snail be considered as in front, the left side of the mantle is more active than the right; so that the lateral turns of the spiral occur in the same direction, thus making due provision for the situation of the heart and the great blood-vessels. But, in the few species which have the heart on the right side, the turns of the spiral are made to the left. The entire history of the inhabitants of shells might be given, indeed, as exemplifying this perfect adaptation of the structure to its inmate.

The mantle frequently expands, and that very suddenly, into a broad surface, and adds to the shell what may be termed a large lip. Sometimes, as soon as this is accomplished, the same part shrinks, and the mantle retires a little way within the shell, still continuing to deposit calcareous layers, which give greater thickness to the adjacent part of the shell, at the same time narrow its aperture, and materially alter its general aspect and shape. So much is this the case, that the shells of the young and of the old mollusks are very different, and would not even be recognised, by a casual observer, as belonging to the same tribe.

Fig. 15.



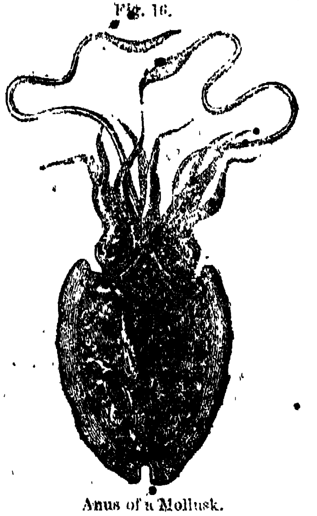
Organs of Digestion, Respiration, and of Circulation, in the Octopus or Poulpe.

Shells frequently have projections, some like thorns; others have ridges, and others rounded protuberances. Those having spines, are called *spinous*; the ribs, which are formed at the various growths of the shell, are named *varices*; and when there are rounded projections, the shells are said to be *tuberculous*.

In some instances we may observe a hard, semi-transparent, calcareous substance, having a glassy appearance on the inner surface of shells; its thickness increasing as the apex is approached, and, in some instances, the spire, which was a hollow space, with thin sides, becomes entirely filled up. The purpose of this is sufficiently obvious. The mollusk is exposed to the violence of the ocean, and hence its shell is rendered proportionately solid and secure. Another mode is apparent, when the mollusk suddenly withdraws its body from the apex, and builds a wall across the cavity, so as to afford itself protection.

Some mollusks are ovoviviparous, that is, the egg is hatched within the body, and the young are extruded alive. In this respect they resemble some reptiles, as well as some quadrupeds. Others are oviparous, that is, the egg is extruded from the body entire, and subsequently hatched. So it is with fowls, and many reptiles. The eggs, as the engraving shows (Fig 23), are of various forms, and often have a foot. Snails, during the spring, deposit a great number of eggs, of the size of little peas, in humid and shady places, at the foot of trees, among roots, and under stones. These eggs are hatched in twenty or thirty days, and the little creatures go forth perfectly formed. The plants in gardens suffer greatly for their support, unless their enemies, the birds of passage, are numerous, by which they are eagerly devoured. Oysters are amazingly fruitful; one of these is said to contain 1,200,000 eggs, so that a single oyster might yield enough to fill 12,000 barrels. The eggs are expelled in the form of spawn—a white fluid, resembling a drop of grease, in which the microscope reveals innumerable minute oysters. This substance is called "spats" by the fishermen, and the matter in which they swim doubtless serves to attach them to various submarine bodies, or to individuals of their own species. In this way are formed immense banks of oysters, which are kept up by collecting the spawn at sea, and in different places along the coasts of England and France, and depositing it in the sheltered and shallow waters selected for "oyster layings," which are usually kept untouched till they have arrived at some size, that is in the course of two or three years.

Fig. 16.



Anus of a Mollusk.

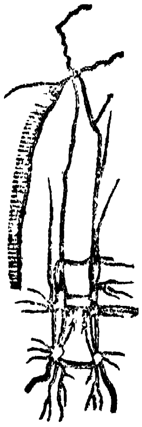
Fig. 17.

The Horns.

Fig. 18.

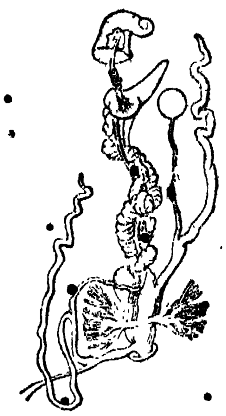
Teeth of a Mollusk.

Fig. 19.



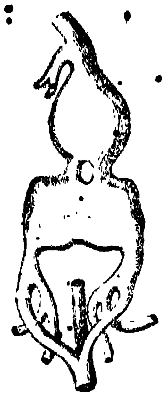
Nervous System.

Fig. 20.



Stomach of a Mollusk.

Fig. 21.



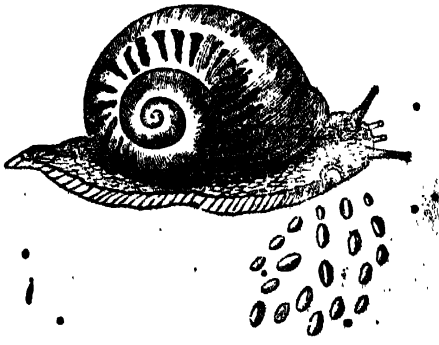
Heart of an Oyster.

The principal object in our first large engraving is a madrepore, or coral, growing on the shell of an oyster, to which it has accidentally become attached. This is one of the products of the polyps, or lithophytes, minute creatures, often adorned with beautiful colours, which require the influence of light and the rays of the sun for their operations, and consequently, never lay the bases of their calcareous tenements in the dark and stilly depths of the ocean. And yet, corals form not merely small trees, but vast beds, often upwards of a hundred feet in thickness, and even more, still covered by the water, and constituting a sunken reef, while again, on the contrary, as on the shores of Timor, near Coupang, they form a bed from twenty-five to eighty feet in thickness, over rocks elevated above the level of the sea. Well have they been described by Montgomery, as—

> "Unconscious, not unworthy, instruments,
> By which a hand invisible is rearing
> A new creation in the secret deep."

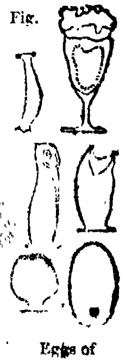
In the South Sea and Indian Ocean the rock-forming madrepores are most abundant. In the Red Sea coral reefs are very numerous, and are usually found extending in a straight line parallel to the coast They differ from the coral formations of the Pacific, inasmuch as they never exhibit a circular form, nor contain a lagoon in the centre. In many places they unite with the coast, which they thus render inaccessible; for though immediately beyond them the water is often very deep, yet but a few feet of water covers them, and in this way they have blocked up bays or harbours, into which, in former times, vessels could freely enter. In other cases the reefs are unconnected with the shore, and often at several miles distance. Towards the sea they sink abruptly, and the water is very deep; but they gradually slope on their side towards the land, and the strait thus formed

Fig. 22.



Deposition of Eggs.

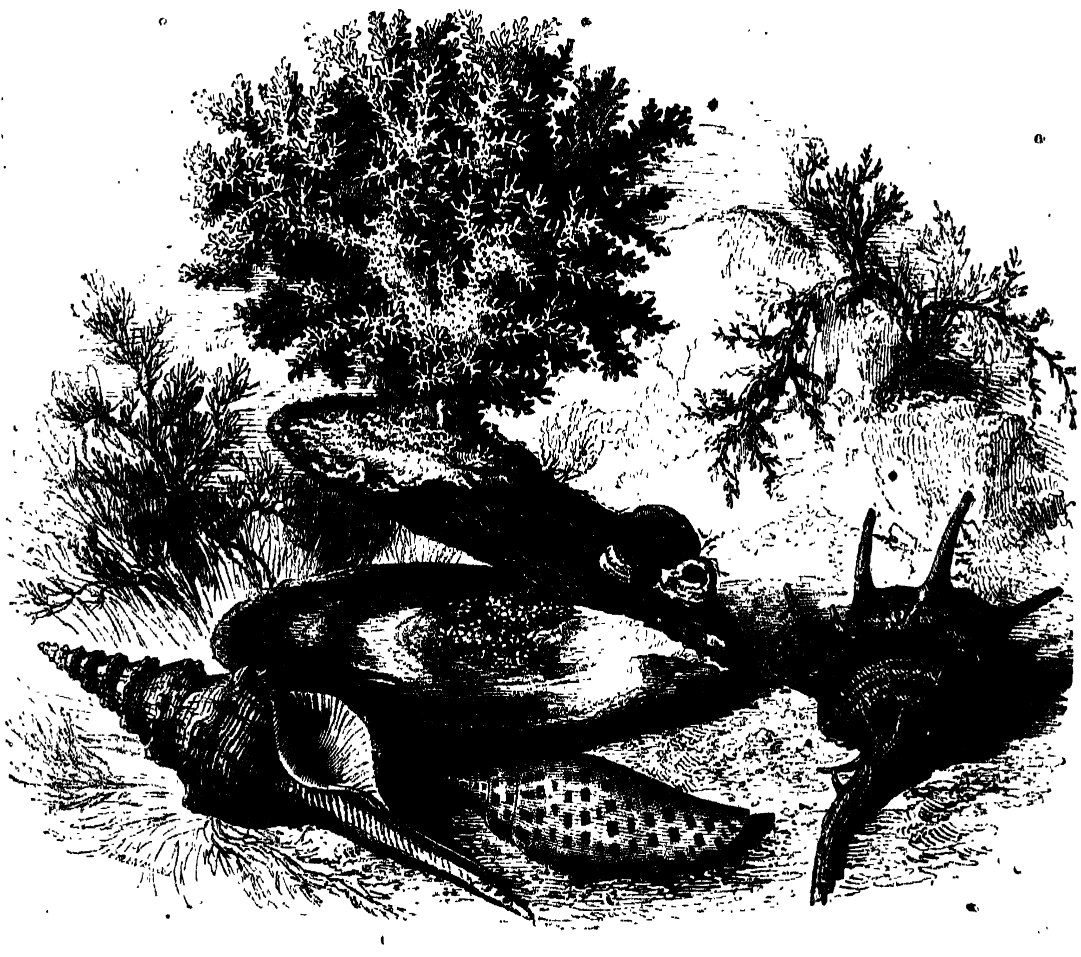
Fig.



Eggs of Mollusks.

will admit vessels of moderate burden. The water here is generally very tranquil, being less influenced by the winds, which, during the greater part of the year, regularly set in at certain times of the day, and strongly agitate the main sea. Besides these larger reefs, there are others, of variable size and isolated character, dangerous to the navigator. Coral reefs more or less surround the shores of the Isle of France, the Papuan, the Marian, and the Sandwich Islands.

The shell to which the madrepore appears attached in the engraving is one deserving of special notice. It is that of the pearl oyster. The specimen, of which a representation is given, was brought from the Isthmus of Panama. Such oysters are found, however, in other places. But though pearls are procured in great numbers about Cape Comorin and the Island of Ceylon, they are, like those obtained in different parts of America, in the islands of the Southern Ocean, as well as on the shores of France and Britain, inferior to those brought from the Persian Gulf.



Madrepore, or Coral, fixed on a Mother-of-pearl Oyster.—Fusus Longissimus.—Volute.—Horned Murex.

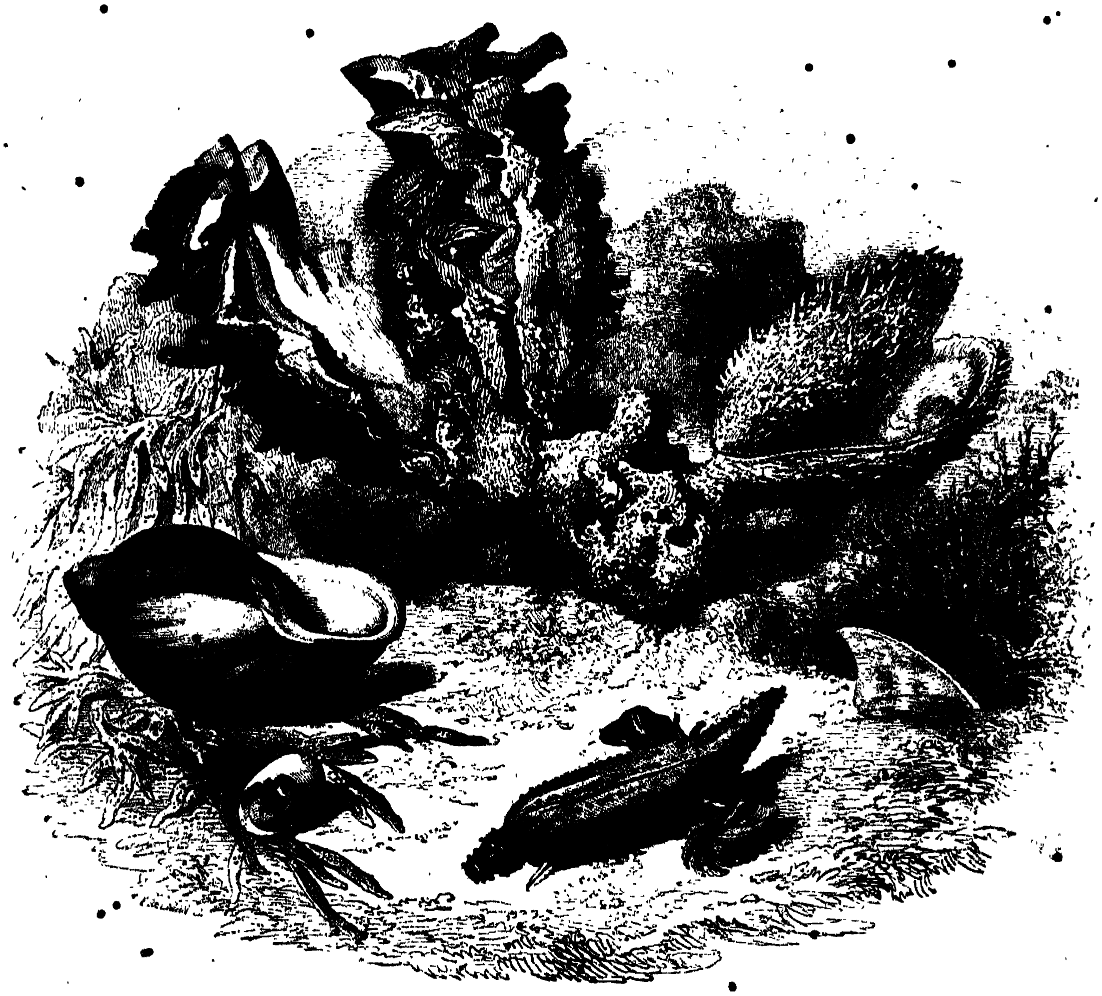
The inside of the oysters that produce the pearls bears a certain resemblance to the gems themselves; and hence it appears that they are only the misappropriation of the matter which is secreted by the animal to form the shell. When a pearl is cut through, it appears to consist of several coatings of this matter laid one upon another, as if formed by successive depositions. If, therefore, the substance of which shells are composed, while floating in the body of the mollusk, meets with a particle of this kind, which has accidentally been removed from the proper passages and become stationary, it may be imagined that it will adhere to this particle, form a layer about it, and, continuing the operation, one of those white pellucid balls we call pearls will be the result. Of the finest pearls, the weight of one carat, or four grains, is worth eight shillings; but should a pearl weigh four carats, its value is estimated at £6 4s. Some of these gems are, however, of extraordinary worth. A pearl brought, in 1574, to Philip II., though no bigger than a pigeon's egg, was valued at £14,400. Julius Cæsar presented Servilia, the mother of Brutus, with one that cost £48,457; the pearl ear-rings of Cleopatra were estimated at £161,458; Claudius possessed one of nearly equal worth; and Lollia Paullina, a celebrated character in the reign of Tiberius, wore two pearls of such immense value, that the historian describes her as carrying in her ears the worth of a large estate.

Just beneath the oyster with its pearls, will be observed the *Fusus longissimus* and the *Voluta Junonia*, which inhabit the depths of the Indian Ocean. The former is of a very pure white, the latter is nearly colourless, and is adorned with brown spots very regularly placed. It is of great value, and it is suppose that there is only one specimen of it in the collections of Europe that one is in the French Museum of Natural History.

The remaining figure is a *Murex*, or rock shell, of which genus there is a very great variety. They are generally of an irregular form, arising from their surfaces being covered with spines, tubercles, or horns. The latter is the case in the present instance; hence the animal is named *Murex cornutus*.

One of those creatures yielded the far-famed Tyrian purple. Of all the ancients, the people of Tyre were the most successful in preparing and using this celebrated colour. The Mediterranean supplied them with mollusca in abundance, and, in order to produce the tint that was in highest estimation, a bath of the liquid extracted from the animal was prepared. In this they steeped the wool for a certain time. When taken out they immersed it in another boiler, containing an extract from another mollusk, the Buccinum. Wool subjected to this double process was so highly valued in the reign of Augustus, that each pound of it sold for about £36. Nor is its enormous price surprising when it is recollected that only a single drop of the colouring fluid is afforded by each animal.

On this page several other interesting objects are exhibited. Two large shells, an *Ostrea* and a *Spondylus*, appear naturally united. Just below is seen a large species of *Helix*, or snail, and beneath it a broken egg, disclosing the shell in its earliest state. Another creature will also be observed. It inhabits the deep waters of the Mediterranean. Its colour is a very fine blue, and the whole surface of its body is covered with spines. On the under side there is a very thin shell, beautiful in form, very transparent, and of a milk-like whiteness. It is known under the name of the *Carinaire* of *Lamarck*. The shell which appears at the right, of a conical figure, is still more rare, the French Museum possessing only a single example. It is called *Carinaire vitrée.*



Ostræ hyotis and Spondylus Delesserti, naturally united.—Snail Shell.—Egg, showing the Snail Shell in its earliest state.—The Carinaire of Lamarck.—The Carinaire vitrée.

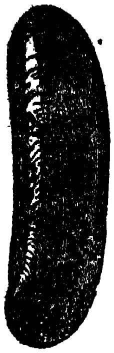
Various classifications have been made of mollusks, and to one of these we shall now allude. The first class is formed of the ACEPHALA, or HEADLESS MOLLUSKS; and of these there are three orders.

The First Order comprehends a great number of mollusks which present one common character: two muscles distant one from the other, inserted towards the lateral extremity of the valves. The points of the insertion of these muscles are as if they were grown on the shell, and are indicated by a depression of which the form is variable. This section includes some creatures which employ the foot with which they are furnished, to execute their limited movements; they live in the sand and the slime, and of these the Solen, or Razor-shell (Fig. 24), may be taken as an example. The animal is provided with a long, pliable, cylindrical leg; when he wishes to bore a hole for his residence, he extends this instrument from the inferior end of the shell, using it as a pointed shovel to make the excavation. When the tunnel is partly formed, the animal advances the leg a little further, fixes it by its point as a hook in the ground, and, using this as a fulcrum, descends in safety, continuing the operation till the shell is buried about two inches under the ground. When the animal wishes to regain the surface, the leg is rolled up into a spherical form, and stretched very tight; by means of the ball thus formed the little creature is preserved from slipping backwards, while by its muscular power it throws the shell forward. By ascending its channel when the tide comes in and brings a multitude of little marine insects, it obtains its food.

Some mollusks can dig into wood, and even into the hardest rocks. One of these creatures is called the *Teredo*, or Shipworm (Fig. 26). It readily enters the stoutest timbers; ascending the sides of the loftiest ships, it most insidiously destroys them; and when a ship is under water, it becomes to these creatures an easy prey.

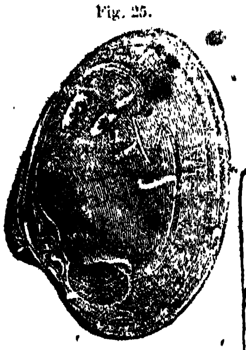
They begin with the softest part, and so small are the apertures at first as scarcely to be perceptible. Strange to say, a teredo is careful never to intrude on the habitation of a neighbour; nor can any passage be discovered between two openings, though only separated by a very thin partition, when a piece of wood is so excavated as to resemble a honeycomb. They always bore in the direction of the grain of the timber: if in their course they meet with another shell or knot, they make a turn; when the obstacle is small they wind round it, and then proceed onwards;

Fig. 24.



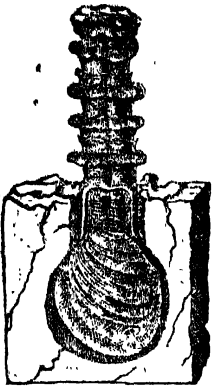
Razor Shell.

Fig. 25.



Muscles inserted towards the lateral extremity of the Valve.

Fig 26.



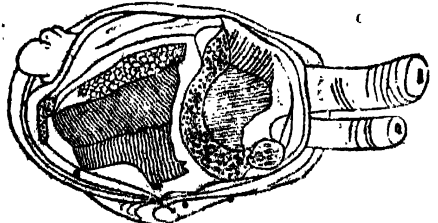
Teredo, or Ship-worm.

but when large, rather than continue any distance across the grain, they make a short turn back in the form of a siphon. They are now common in all the seas of Europe, and continue to do extensive mischief to ships, piers, and all submarine wooden buildings.

Instances are not wanting in which there springs from "partial evil, universal good;" and notwithstanding the ravages committed by the ship-worms, they confer on us no ordinary benefits. As Montague remarks:—"That the *teredines*, and many aquatic animals, were created by the Father of the Universe for most beneficent purposes cannot be disputed; for though they may seem to impede, and even to destroy, the operations of man, yet they are of such importance in the great scale of nature that it has been observed, and it would not be difficult to prove, that we should feel the want of one or two species of larger quadrupeds much less than one or two species of these despicable-looking animals. The immense trees and forests of tropical countries, either overthrown by tornadoes or partially destroyed by insects, and then carried by rapid torrents into the rivers, would not only choke them up, but even endanger the navigation of the neighbouring seas, were it not for these small yet mighty agents of dissolution. Nothing can more plainly demonstrate the power of an all-wise Ruler of the Universe than the work assigned to these animals, whose business it is to hasten the destruction of all useless matter."

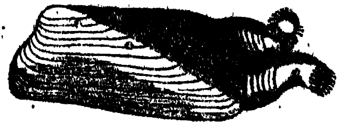
Another creature, the Pholas (Fig. 30), is equally remarkable. All the animals of this genus are borers, perforating wood, clay, limestone, and sometimes burying themselves in the sand, thus forming a retreat in which they pass their lives. Their name is derived from a word which means a hiding-place. The largest species and the finest specimens are most frequently found in chalk, which, being the softest of all calcareous substances, admits of a more easy and rapid progress to the animal than the hard stones in which it is sometimes discovered. How it forms such a dwelling remains to be determined. As the entrance is the smallest part, it is evident that the pholas must have penetrated the rock when it was young and small, and enlarged the opening as it increased in size. The position of the hole is always oblique to the horizon, and it is terminated by a rounded cavity. This cavity receives the body, while the farthest end is occupied by the proboscis, which is continually protruded to the orifice to procure the sea-water, on which the pholas subsists. Many have supposed that the animal possesses some liquid which acts as a solvent on the substance it enters; but as in this there is great variety, the idea by no means solves the existing difficulty. Other mollusks are distinguished by the places the muscles occupy in the interior of the shell, of which Fig. 27 is an example.

Fig. 27.



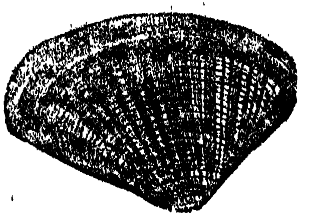
Muscles within the Shell.

Fig. 28.



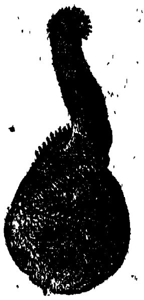
Perforated Shell.

Fig. 29.



Pepper Mactra.

Fig. 30.



The Pholas, or Stone-borer.

It is wrong to suppose that the connection between the shell and its inhabitant resembles that between the builder and the house he erects, since it is inseparable during the life of the mollusk. The connection arises, be it observed, from muscles, which going forth from the animal, are inserted in the walls of its dwelling. In bivalve shells, the mollusks are attached by one or two larger and powerful muscles, sometimes called *transverse*, because, passing through the body, they are inserted at opposite points into both valves; and sometimes *adductors*, because they close the valves and keep them shut. The force with which they do so is frequently manifest, as when it requires no little strength to separate the shells of an oyster.

Some mollusks are provided with a foot, which is composed of a mass of muscular fibres, interwoven together in a very complex manner, and resembling the muscular structure of the human tongue. It has, in consequence, a power of motion in all possible directions, and may be readily protruded, retracted, or inflected; in some instances it has a spongy texture. The animal can, therefore, inject a considerable quantity of water, and thus increase its size.

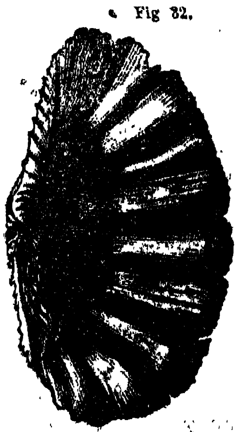
Another section is formed of those mollusks whose foot is small and compressed. They have a ligament within, with or without an exterior ligament. Such is the Pepper Mactra. (Fig. 29). It is of a yellowish, reddish, or white colour, often stained with black, occasioned by the mud in which it resides. It is chiefly found at the mouth of inlets or rivers, not remote from fresh water; for, though it always seeks a spot within reach of the flux of the tide, it delights in situations over which fresh water occasionally flows. The animal has not the power of progressive motion, but it is enabled slightly to change its position by means of its small compressed and muscular foot.

Other mollusks have only an exterior ligament; the shell is perforated (Fig 28), and more or less gaping. It presents two or more principal teeth on the same valve.

Fig. 31.

Shell of a Mussel.

Fig 32.



Ligament on the Edge of a Valve.

The Second Order of Headless Mollusks is formed of those which have only an adductor muscle which traverses the body, the point of insertion being marked on each valve. Some of these have a marginal ligament, placed on the edge of the valve, as it is in the following instance (Fig. 25). One of these mollusks weighed no less than 498 English pounds; it furnished a hundred and twenty men with provision for a whole day, and so great was the power of the adductor muscles that the sudden closing of its valves was sufficient to snap a cable asunder. A specimen brought from Sumatra, and preserved at Arno's Vale, in Ireland, had valves measuring four feet six inches in length, two feet five inches and a half in breadth, and one foot in depth. A shell of the same species forms the baptismal font in the church of St. Sulpice in Paris.

Another creature of this order is the Mussel, an animal widely distributed, and appearing on our coast in the greatest abundance. It is gregarious, being found in extensive beds, which are always uncovered at low water. It is found likewise in the crevices of the rocks. In the mussel fishery women and children are chiefly employed, and they detach the mollusks with an iron hook from the beds or rocks to which they adhere by means of their fine cartilaginous threads. In this country they are conveyed directly to the market; but in some parts of France they are kept for a time in salt-ponds, to fatten like oysters, into which, however, they admit small quantities of fresh water. The flesh of the mussel is of a yellowish colour, and considered very rich, especially in autumn, when it is in season. By some persons it is considered deleterious, but it is during the spawning season, in the Spring, that the greatest danger is to be apprehended. This noxious quality was long attributed to the pea-crab, which is often found within the shells of mussels. It is now properly ascribed to the food of those creatures, which, at certain seasons, consists chiefly of the noxious fry of the star-fish, and likewise to a disease from which mussels suffer in the spring.

A curious fact is mentioned by Mr. Stephenson, when describing the erection of the lighthouse on the Bell-rock. On the first landing of the workmen there, the mollusks, called limpets, well known from their univalve conical shell, of a very large size were common, but were soon picked up for bait. As they disappeared, an effort was made to plant a colony of mussels, from beds at the mouth of the river Eden, of a larger size than those which seemed natural to the rock. These larger mussels were likely to have been useful to the workmen, and might have been especially so to the light-keepers, the future inhabitants of the rock, to whom that mollusk would have afforded a fresh meal as well as a better bait than the limpet; but the mussels were soon observed to open and die in great numbers.

The reason of this was not easily discernible. For some time, it was ascribed to the effects of the violent surge of the sea—a notion which was not, however, free from objection. At length it was ascertained that the *Buccinum*, or Whelk, had greatly increased, and proved a successful enemy to the mussel. The whelk, being furnished with a proboscis capable of boring, was observed to perforate a small hole in the shell, and thus to suck out the finer parts of the body of the mussel; the valves, of course, opened, and the remainder of the mollusk was washed away by the sea.

The perforated hole was generally—such is the instinct of these little creatures!—in the thinnest part of the shell; it was perfectly circular, but widened towards the outer side, and so perfectly smooth and regular, as to have all the appearance of the most beautiful work of an expert artist. No difficulty existed as to the course that should now be taken. It became a matter extremely desirable to preserve the mussels, and, as it seemed practicable to destroy the whelks, this work was immediately undertaken. But serious disappointment arose, and, after many barrels of them had been picked up and destroyed, their extirpation was regarded as absolutely hopeless. The mussels were thus abandoned to their foes, and so successful were their ravages, that, in the course of the third year's operations, not a single mussel of a large size was to be found upon the Bell-rock; and even the small kind which bred there were chiefly confined to the extreme points of the rock, where, it would seem, their enemy cannot so easily follow them.

The pinna, like the mussel, attaches itself to rocks by a byssus, or cable, but one that is very remarkable. It consists of threads, which exude in a glutinous state from a particular organ at the base of the foot. They are not spun out by being drawn from the secreting apparatus, but are modelled, so to speak, by the foot itself. The structure of the organ, and the process to which it is adapted, are alike extraordinary. From the root of the foot to its extremity there runs a long groove, the sides of which are so constructed as to fold over, and thus form a minute canal; and along this canal, as a mould, the glutinous matter runs, soon acquires consistence, and appears as a thread. On the thread becoming sufficiently strong, the animal protrudes its foot, and with its extremity attaches the end of the thread to the substance on which it is to be fixed; and then, expanding its foot, opens the canal so as to free the thread from its inclosure. The foot is then withdrawn, new matter is poured along the grove, and thus the operation is repeated till the cable is complete.

THE CHEVALIER CLAUSSEN'S FLAX-WORKS AT STEPNEY.

The purplish-blue flower of the flax-plant sometimes catches the eye as we pass by the corn-fields in which it most generally grows. The blossoms spring from a stem about eighteen inches high, from which also a few leaves issue; but they are alike small in proportion to the flower, whose petals are exceedingly frail.

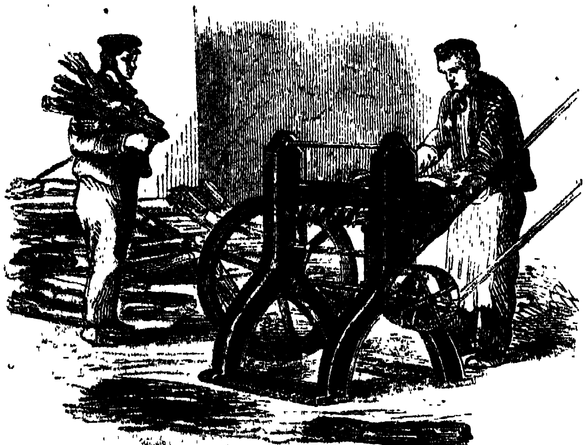
Incalculable is the benefit which this plant has rendered to man. Its strong fibres yield thread or yarn for every kind of manufacture, from cambric, however delicate—so that its finest kind has been called "a web of woven wind"—to the lawn of bishop's sleeves, the shirting with which we are so well acquainted, and all the varieties of bed and table linen. When its seeds are expressed, they yield the linseed oil, so extensively used in the arts, particularly for painting; and which is also frequently employed in surgical cases, from its emollient nature. The seeds that remain, after obtaining the oil, are moulded into cakes, which are used to a very large extent for fattening cattle; and the manure produced from bullocks fed upon it is of great value for agricultural purposes.

Linen constitutes, in modern times, a staple manufacture in almost all European countries. At Cambray, a city of France, the beautiful kind called cambric was first manufactured, and for many years England spent in its purchase not less than £200,000 per annum. From this vegetable, too, the lace of Brussels, Valenciennes, Lisle, and Mechlin, is obtained. From Russia we import annually half a million of quarters of flax-seed, the value of which is nearly £2,000,000 sterling. Upwards of 70,000 tons of oil-cake are annually imported, the value of which exceed £500,000; while the total value of the flax-fibre imported for manufacturing into linen, sail-cloths, tarpaulings, rick-covers, sacking, and various other materials, exceeds £5,000,000 annually.

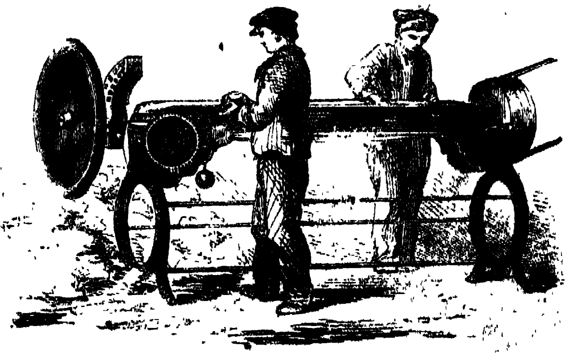
It might, therefore, be supposed that our climate is unfavourable to the growth of flax; but so far from this being the fact, many large tracts of land in the United Kingdom are pre-eminently adapted to it, and in ordinary seasons it will come to perfection in most soils of Great Britain. Hindrances have hitherto existed to its culture; and it is, therefore, a truly gratifying task to show how completely they are removed by means, easily accessible, the products of intelligence and skill.

One obstacle has arisen, for example, from the idea that flax is an exhaustive crop, and that it consequently injures the soil. But an examination of the stem shows that those portions of it which are required for the purpose of manufacture, are derived almost exclusively from the atmosphere. Indeed, to so small an extent do the inorganic properties of the soil enter into the fibre, that it has been found, upon analysis, that 100 pounds do not contain, upon an average, more than two pounds of mineral matter. This chemical test is fully sustained by practical experience. Sir R. O'Donnell, one of the largest cultivators of flax in Ireland, and who has grown to the extent of 700 acres in one year, states, in the *Morning Chronicle*, "As the result of many years' experience that, when grown in its regular rotation, flax is

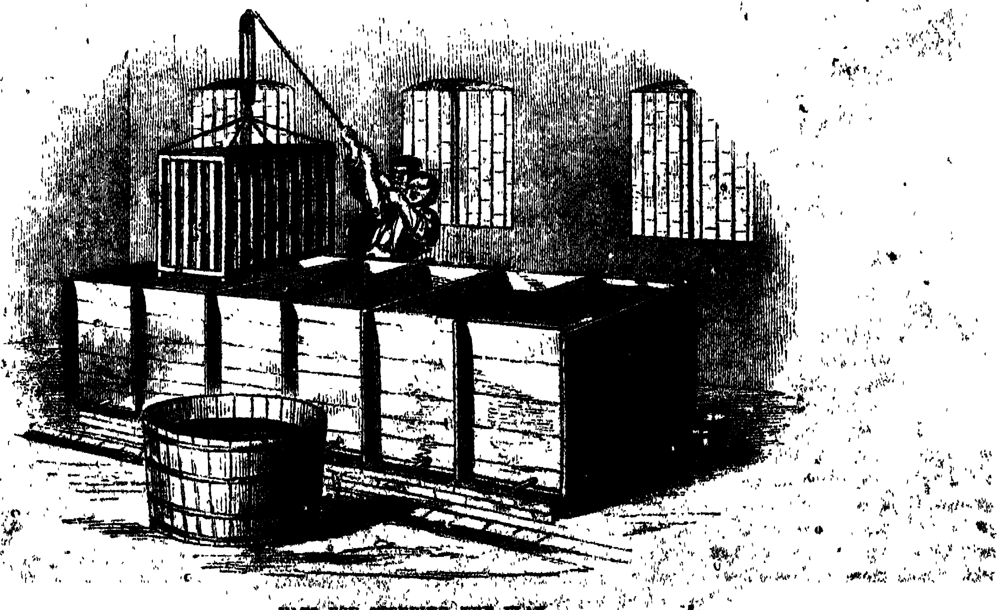
RIPPLING THE FLAX.



BREAKING FLAX STRAW.



CUTTING FLAX COTTON.



VATS FOR STEEPING THE FLAX.

far from being exhaustive; that it tends greatly to improve the soil, and the character of the other crops in the rotation. It is, above all, most valuable for laying down land after wheat or oats, as the process of pulling the flax, after loosening the earth around the roots, improves greatly the quality of the grass crops." Similar testimonies might easily be cited as given by English flax-growers.

Where, however, the plant was actually grown—the objection just alluded to not being allowed to operate—the farmer was compelled to submit to great trouble and annoyance, it being considered indispensable to *steep* the flax, in order to prepare it for the market. Thus various inconveniences attended the process of "dew-retting," or allowing it to remain exposed on grass lands, for a considerable number of days, to the action of the rain, dews, and atmosphere. In Courtrai, the principal flax-growing district in Belgium, the best mode, probably, is adopted—that of placing the flax in running streams. But with us it is impracticable; for, independently of certain peculiarities in the river Lys, which ours have not, the streams in this country are mostly too rapid to answer the purpose. In using pits or pools sunk in the ground, it is very difficult to secure all the conditions that the process of steeping requires. Clay, gravel, alluvial, and peaty soil, for example, will each impart some peculiar dye to the material, which more or less affects its value; while the water used must not be spring-water, nor that which has flowed over any soil containing metallic deposits, nor even that which has fallen in rain. But, were the necessary conditions all secured, there are the uncertainties and risk of either over or under-steeping the flax. As one sultry night, when the flax is in the steep, is enough to carry the fermentation beyond the safe point; so during winter the process must be discontinued altogether, in consequence of the temperature. Even the steeping the flax in hot water, which has been very urgently recommended, only partially separates the fibres. The best of these processes has, however, been demonstrated not only to be unnecessary, but highly injurious, as they impart injurious dyes to the fibre, and give it an inequality of strength, which are exceedingly difficult to be overcome in the subsequent stages of manufacture and bleaching.

HEVER CASTLE, KENT.—(*See page* 91.)

The question, therefore, arises, How shall the various processes required in the manufacture of flax be passed through? And this we now proceed to answer—availing ourselves of clear and accurate illustrations.

It is necessary here to premise, that the former practice was to gather the flax-straw when the seeds were unripe; but by the Chevalier Claussen's process, it is pulled at the proper season, when the seeds are ripened; thus securing alike the obtaining of the oil-cake and the oil.

On the flax-straw being gathered, it is rippled: the process being, sometimes, performed in the field, a winnow-cloth being spread under the machine. This is an iron comb, having smooth, round teeth, standing about twelve inches out of the wood, and placed so close together that the seeds cannot pass through. The ripple, as it is called, is screwed down to a long stool, and two persons, seated at the ends, alternately draw their handful of flax through its iron teeth, as represented at the top of the page of engravings. Rippling effectually separates the bolls or seed-heads from the stalks.

The breaker, a machine seen just below—now, for the first time, applied to flax by M. Claussen—is a modification of an already existing apparatus. It divests the flax-straw of three-fourths of its bulk—thus overcoming a difficulty experienced in the sending to market of any large quantity; while the refuse is applicable as food for cattle, as well as for manure. The flax is also brought into a state adapted to the manufacture of sail-cloths, ropes, cordage, and other coarse fabrics.

But a more minute separation of the fibres than can be effected by mechanical means, is necessary for those of a finer description; and to the application of chemistry to this purpose, M. Claussen was led by a train of interesting circumstances. Wandering along the luxuriant banks of one of the Brazilian rivers, his attention was attracted to a white, down-like substance, adhering to the branches of trees, overhanging and touching the stream. On obtaining a quantity of it, he was so pleased with its character, that, thinking he had discovered some vegetable product hitherto unknown, he determined to trace it, if possible, to its source, and to ascertain the plant which produced it. Pursuing his task with great ardour, he eventually found that the substance had been washed from a bed of flax-straw, the produce of some of his own land, and which, long before, he had caused to be thrown, as useless, near the banks of the river. As the swollen waters had occasional access to this heap, fermentation and the decomposition of a portion of the plant had taken place; and in time the influence of natural chemistry had so saturated the filaments of the flax-fibre as to give the mass a cotton-like appearance; and some of it having been washed by the river, had been arrested by the overhanging branches. On the facts thus brought before him, M. Claussen proceeded carefully to reason, and the processes now to be described are, therefore, the result, not of mere accident, but of inductive research.

The flax, brought from the "breaker," is boiled for four hours in *hot* caustic soda, or steeped in a *cold* solution of it for twenty-four hours. It is afterwards washed in water containing one per cent. of sulphuric acid, and then in pure water, when it is dried, and subsequently treated by scutching, heckling, &c., according to the universal practice in the linen manufactures. Here, then, we have an immense improvement, by the long and difficult process of fermentation, which occupied six weeks, being entirely avoided. Yet the process is most effective and profitable, as *twenty* per cent. of long flax may be obtained instead of *seventeen*, while the substance is far more silky and soft. It is a popular error that Claussen's process is merely to turn flax into cotton, which people say is like "turning gold into lead;" whereas he obtains by it a much larger proportion of the long and valuable flax, and renders the refuse—ordinarily considered comparatively worthless—by a process now to be explained, capable of being worked into cotton, wool, or silk fabrics.

According to the mode long adopted in the linen manufacture, an immense quantity of tow is made, which can only be used for twine and similar coarse purposes. But the chemical process employed by M. Claussen effects a change which is highly important. A series of vats will be observed in the engraving. The first vat holds a solution of carbonate of soda; and in this the fibres, previously boiled and washed, are saturated for a quarter of an hour. It is then removed to the next vat, in which there is five per cent. of sulphuric-acid, the effervescence causing the carbonic-acid gas to separate and divide the fibres, thus rendering them more flocculent, and completely altering their specific gravity, as they rise now to the top of the vat, while before they sank to the bottom. The next process is to place them in another vat of soda, to neutralize any remaining acid; and this being effected, they are transferred to the bleaching-water of the fourth vat, composed of a solution of chloride of lime, and sulphate of magnesia, thus forming a hyper-chlorite of magnesia. In this preparation they remain for two hours, during which they are perfectly bleached, requiring only to be transferred to a bath of diluted sulphuric-acid, and then to pure water. Our illustration shows the arrangement of the six vats, with the cradles in which the fibres are placed. One is being hoisted out, to be removed to the next vat; the one at the end will be observed within the vat. The fibres, on being withdrawn from the vats, are dried by atmospheric or steam-heat, or hot air. They are then taken to a machine similar to that used in chaff-cutting—of which an illustration will also be noticed—where they are cut into lengths adapted for spinning or cotton machinery.

To specify all the advantages secured by those processes would far exceed our limits. It must, therefore, suffice to observe that the following are a few out of many:—Any cloth made from flax cotton-yarn may be readily printed, dyed, and bleached by the ordinary cotton processes. The flax fibre, from its milling properties, is capable of being made into common felt hats with or without an admixture of wool. Cloth in which flax is mixed with wool is reduced in price from twenty-five to thirty per cent. Flax may be spun with silk on the existing silk machinery; and any useless flax can be converted into a first-rate article for the paper-maker.

The advantages thus presented, are opened to our view at a critical period. Our supplies of cotton from America appear to have reached their maximum, and consequently an efficient substitute is required to provide the *means* of employment for our continually-increasing population; while our importations of flax from Russia have suffered a decrease of about twenty per cent.

And why, it may be asked, should we thus continue dependent on continental Europe for the flax which the United Kingdom is perfectly capable of producing? Why should not the sums we spend annually, for oil-cake and flax-seed, go into the pockets of the employers and the employed of our agricultural districts? Especially when previously-existing difficulties are entirely removed—when there is a serious diminution of our imports—when our linen manufacture calls aloud for enlarged supplies. Its progress, in consequence of the great improvements which have been made in machinery during the last twenty years, has been almost unparalleled. In that time the exports of linen have increased from 50,000,000 to 105,000,000 of yards, and its declared value from £1,700,000 to upwards of £3,000,000. No attempt whatever has been made by our agriculturists to meet this enormous and rapid increase in the demand for the raw material; and, as a consequence, the foreign producer has been reaping a golden harvest. The imports of foreign flax have increased from 936,000 cwts., in 1831, to 1,800,300 cwts., in 1842; the value of the increased imports being not less than two millions and a half, nearly the whole of which is paid for in money sent out of the country.

It was, therefore, admirably said by Sir James Graham, in parliament, in reply to the honourable member for Carlisle, who had alluded to the condition of its hand-loom weavers:—

"But this is a question of the price of cotton, and, strange as it may be, it opens out a ray of hope even to the landed interest. Whence does this ray come? Why, it comes from the quarter whence they least expected it. It is from the mills of Messrs. Bright and Co. It is from Rochdale that this light opens on the landed interest. Hopes are entertained—confident hopes—that, by a new management of flax-stalk, it may be used in large proportions, with great advantage and diminution of cost, in mixture with cotton-wool, sheep's-wool, and even with silk-wool. And, sir, for my part, I cannot conceive of any dispensation of Providence more merciful, than that science and skill should succeed in overcoming this difficulty; whereby we should be rendered, in a great degree, independent of foreign supply, while a great stimulus would be given to our manufactures; and, if, happily, this encouragement to the cultivation of flax here should succeed, I am very confident we shall hear no more of the distress of these hand-loom weavers, that the cultivation of land will be largely improved by the introduction of capital in growing this new plant, and that this plant will be of great service to the agriculturist, from its being peculiarly adapted to increase the fertility of the soil." The hopes to which Sir James alluded, as entertained, have since been realised; and it only remains for us to express the ardent desire that, ere long, by the series of means so happily discovered, agricultural and manufacturing prosperity may become identified.

HEVER CASTLE, KENT.

HEVER CASTLE, about two miles from Penshurst, Kent, has connected with it historic associations of more than common sadness, and in a more than common manner illustrates the sudden changes which compose what we call life.

It was in the reign of Edward III. that it was built, by William de Hever. It consists of a castle, to which a quadrangular house is attached, the whole surrounded by a moat, beyond which several outbuildings, now used as barns, were arranged, to meet the wants of extra visitors, and for other purposes. The elevation, or front of the castle, is composed of a central keep, pierced by a gate crowned by strongly-projecting machicolations, and flanked by two square towers. The gate is of vast strength, and seems to have been the point of all others on which the architect bestowed the utmost resources of defensive skill. First, we come to a deep-bowed door-way, in part defended by a strong portcullis and two thick oaken doors, barred, bolted, and studded with iron knobs. Immediately behind these are two guard-rooms. A broad avenue of solid masonry succeeds, and leads straightforward to a second portcullis, and this again to a third, occupying, altogether, the whole depth of the castle. These gates lead the visitor into a spacious court-yard, formed on three sides of the house, which is built in the very early Tudor style; and on the fourth, by the castle. The court is neatly paved with red bricks, fancifully disposed. The front of the house was formerly richly embossed and painted with quaint colours. The great dining-room, now used as a kitchen, is a most interesting place, and contains a great part of the original "Bullen" furniture; but the room the visitor seeks with the greatest curiosity, is that known as Anne Boleyn's bedroom. This is really a good apartment, beautifully panelled, and contains the original family chairs, tables, muniment-box, and Anne's bed, a very heavy affair. A door in one of the corners opens into a strong dark cell, in which, popular tradition says, Henry attempted to starve Anne to death. To this apartment several ante-rooms succeed, and the suite terminates in a grand gallery, occupying the whole length of the building, in which the judicial and social gatherings of the ancient family were held. It contains three recesses. In one of them, it is said, Henry, on one of his visits, received the congratulations of his gentry. In the church—in the tower—sleeps, till the resurrection morn, Sir Thomas Boleyn, whose ill-fated daughter here was wooed and won by a royal heart, but wooed and won merely to be thrown away, as a child throws away a flower when it has lost its sweetness and perfume. Let us briefly chronicle this dark chapter in our annals:—

After Henry VIII. had been married some time, the royal will became desirous of change. Catherine had no longer the bloom of youth, while Henry was yet in his manhood's prime. What with religious scruples, feigned and real desires felt, Henry became uneasy. When first his marriage was consummated, there were many who held it forbidden by the laws of God. Archbishop Warham had spoken against it from the first. To effect it, a dispensation from the Pope was necessary; and Catherine of Arragon, then worthy of a monarch's love—not as Holbein drew her, when decay and sorrow had dimmed the light of her eye and the rose on her cheek—became once more a bride. Through many a year they had lived together, and Henry had become desirous of change. Most of the writers on this period of our history lay too much stress on Henry's religious scruples. We candidly acquit our English Bluebeard of them. In 1527, when a proposal for marrying the Princess Mary to Francis was entertained, the French Minister urged, in opposition to it, the illegitimacy of the Princess. Nothing better could have answered Henry's purpose. The royal conscience that had slept for twenty years now awoke, and deep was the agony of the royal heart. Henry loved Catherine. He felt, as he had published in his address, that "in nobleness of mind she far transcended her nobleness of birth." Were he free to choose amidst "all the beauties of the world," Catherine would be his choice; "her mildness, prudence, sanctity of mind, and conversation," he felt, were without parallel; "but, alas!" says the royal hypocrite, "we were given to the world for other ends than the pursuit of our own pleasures;" so that, rather "than commit impiety against heaven, and ingratitude against our country—the weal and safety of which every man should prefer before his life and fortune"—Henry could sacrifice even so noble a wife. Goldsmith tells us of a drunken soldier staggering in the streets, who was heard muttering his determination to live and die for "our holy religion." The religion for which Henry was willing to make such a sacrifice was of a similar character. Religion has often been wronged by men, but never more so than when under her name a woman, whose fair fame calumny had never dared to stain—a stranger in a strange land, already weakened by the approach of age, bereft of hope—was basely trampled under foot by the man who had made her his wife. Poets tell us,

> "In all the drama, whether grave or not,
> Love rules the scene, and woman forms the plot."

This truth was illustrated on a somewhat large scale at the time of which we write. Those were the days when

> "Love could teach a monarch to be wise,
> And gospel light first beamed from Boleyn's eyes."

At the bottom of the whole was not religion, but a woman. There had come to Henry's court a maid, fresh and fair, who to English beauty had added the lively charm of foreign manner. When Mary, the gay and graceful sister of Henry, became the queen of Louis VII., she was accompanied by Anne Boleyn; and when her mistress became the wife of Brandon, and returned to England, Anne still continued at the court of France—a court redolent with her praise. Viscount Chateaubriand describes her, as "rivalling Venus." It is most probable she was present at the Field of the Cloth of Gold, where Henry might have been smitten by her charms. Not long after, she returned to England. The conduct of most women is an enigma, and that of Anne is no exception to the general rule. Like most of her sex, she loved to reign;—like the worst, she seems to have laid herself out for admiration;—like the best, she seems to have guarded her honour with a firm, unflinching hand.

Henry, who, though he boasted no longer the comely proportions of his youth, was yet no stranger to affairs of gallantry, was not long before he made Anne aware of the passion with which she had inspired him. A high-minded woman would have repulsed him at once from her presence; but he was not the only married man who had dared to talk to her of love. Wyatt had done the same. Had Anne been easily led astray, she might have followed the example she had seen set by the Viscount Chateaubriand in the French, and by Lady Salisbury in the English Courts, and won the splendid wages by which kings tempt to sin. Catherine was living. Not a whisper had been breathed of divorce. At the best Anne could but hope to be the first in a long line of coroneted infamy. Natural historians tell us nature has endowed every living thing with some more or less potent weapon of defence. In the autumn may be seen on the trunks of trees a moth, exactly resembling a withered leaf. Often the deception is successful, and the moth escapes. For strength and power cunning is often a tolerable match. To what Cavendish not incorrectly terms Henry's "pernicious and inordinate carnal love" Anne opposed, and not in vain, the wiles of woman's art. Instead of becoming ranked with the Castlemaines and Portsmouths of the Restoration, she was enrolled in the long illustrious line of English queens. She took her mistress's place on the English throne, and in the heart of the imperious king. Henry's love was to be gratified, and Anne's honour was to be preserved. Thenceforth the path of procedure was clearly marked. The old love was to be sacrificed, a new one was to be taken in her place. The wife of twenty years was abandoned as a childish toy. By fair means or foul, Anne Boleyn was to be invested with the name and dignities of an English queen.

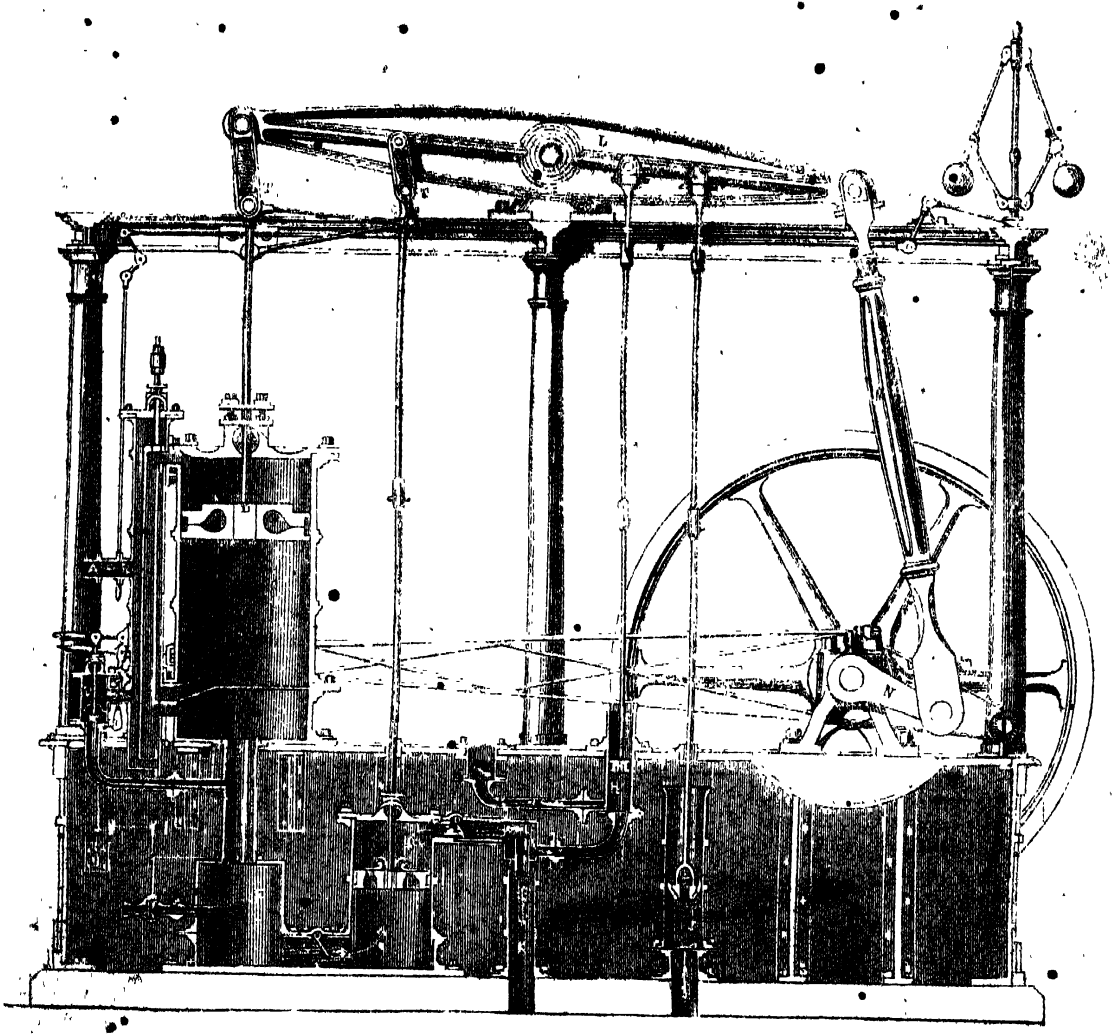
The thing was done, but at a tremendous price. To attain the end, it was necessary that Henry should shatter more than one tie, and break more than one heart. Catharine fell not alone. Her fall wrought that of the Cardinal as well, and his downfall was his death. Anne certainly had an aversion to Wolsey. Women by instinct know their foes, and Anne felt that sooner or later their interests would clash. Hence it was that Wolsey was banished the royal presence, and that Anne prevailed upon Henry never more to see the man who had served him faithfully—who had pandered to his pleasures—who had promoted his interests for nearly twenty years. Wolsey felt this blow to his heart's core. All that breaks man's spirit—service unrequited, disgrace undeserved, confidence rejected, pride insulted, fealty betrayed—fell to his lot, and his heart burst beneath the stroke. As the sun was setting, and the leaves were falling, and winter was drawing nigh, a weary cavalcade stopped before Leicester Abbey. "Father," said a broken-hearted, emaciated man, as the abbot approached the mule on which his visitor was seated, "I am come to lay my bones among you." The next day the Cardinal was dead.

But it mattered not Anne. From Hever Castle she passed in triumph over bleeding hearts to a royal palace. Three short years, and, with a bleeding heart herself, she passed from that royal palace to a prison and a bloody death. From righteous retribution neither kings nor queens are exempt, and it was Anne's sad fate to drink the cup held to her lips to the dregs. *Her* maid of honour became queen. The chamber in which Anne slept, on the eve of the morn which placed on her head a crown, was her prison. The wild frenzy of her mind was construed into a confession of guilt, and she, whom Henry had striven so fiercely to win, was foully murdered, to pander to a monarch's lust. No more from the towers of Hever Castle Anne's bright eyes looked for her coming lord—no more careered gaily along its leafy park the royal cavalcade—no more echoed, under its vaulted roof, a monarch's laugh—no more, in its stately gallery, paced a monarch, telling monarch's love. The spell was gone for ever the mad fire of passion burnt no more. A fresh fancy made captive of the king, and Hever Castle became what it now is—a ruin and a wreck. We need not point the moral—our readers can do that for themselves. *Sic transit gloria mundi*

BOUDOIR OF ANNE BOLEYN IN THE GATE TOWER OF HEVER CASTLE.

ANTECHAMBER IN HEVER CASTLE, KENT.

Mr. Watt, in his patent of 1769, proposed the construction of steam-engines which should be worked by the force of steam only, without condensation, and in which the steam, after having performed its work, should be discharged into the atmosphere. This is, in fact, the principle of all those engines now called high-pressure or non-condensing steam-engines, which are chiefly used for the purposes of locomotion either by land or sea. All attempts, however, to construct engines of this description, proved unsuccessful, till Messrs. Trevithick and Vivian, in 1802, obtained a patent for the invention of a high-pressure steam-engine. Their engine was practically applied to railroads in 1812. Improvements on locomotive engines were gradually introduced by Stephenson and others, from 1814 till 1829, when they reached the speed of 30 miles per hour, on the Liverpool and Manchester Railway. In a period of less than six years after the latter date, under the improvements of Messrs. Sharp and Roberts, they reached the speed of [illegible]0 miles per hour. The construction of the most improved form of this species of engine will be understood by inspecting the engraving and following description of Messrs. Watkins and Hill's Sectional Model.



SECTIONAL MODEL OF A DOUBLE-ACTION CONDENSING STEAM-ENGINE.

A The steam-pipe, through which the steam passes from the boiler to the engine.

B The slide, for directing the passage of the steam either above or below the piston, and also of the exhaust steam into the condensor in the direction of the arrows.

C The steam cylinder.

D The piston and piston-rod, the latter passing through the cylinder-cup and stuffing-box, and communicating the power it derives from the force of the steam to one end of the beam.

E The condenser for receiving and condensing the steam from the cylinder after it has performed its duty, and by this condensation creating a vacuum alternately above and below the piston.

F The injection-cock, for regulating the supply of cold water into the condenser from the cistern.

G The air-pump, for withdrawing the condensed steam and water from the condenser, which, after passing through the valves in the piston at the down stroke, is forced through the passages at the up stroke, in the direction of the arrows, until it reaches

H, The force-pump, into the cylinder of which the hot water is admitted at the up stroke, and at the down stroke it is forced, in the direction of the arrows, into the boiler, thus keeping up a constant supply of hot water. The various valves are represented all open and close at the times absolutely necessary in the real engine, but this movement can only be seen by inspecting the sectional model at work.

J The cold water pump, for the purpose of supplying the cistern constantly with water from the well.

K The waste-pipe, through which the excess of cold water returns again to the well.

L The beam.

M The connecting-rod.

N The crank.

O The fly-wheel.

P The governor, connected by means of the rods (p p) with the throttle-valve in the steam-pipe.

R The throttle-valve, which partially closes the steam way when the governor-balls fly from the centre.

S The eccentric-rod, so called from its working on an eccentric fixed on the fly-wheel shaft, while the smaller end is connected with the slings which work the slide (B), and thus the eccentric motion causes the slide to pass through a very small space while the piston makes one stroke.

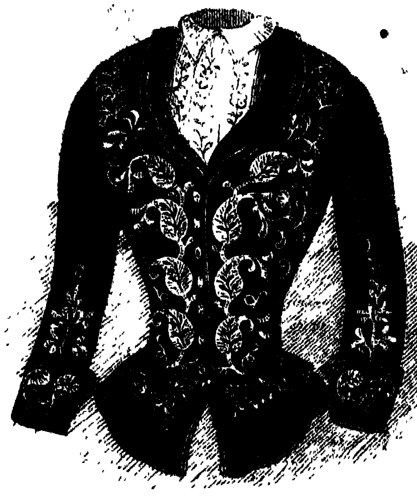
TT The parallel motion.

V The blow-valve.

THE LADIES' DEPARTMENT.

EMBROIDERED PARDESSUS.

The fashionable Pardessus, of which we give an engraving, is for carriage dress, and made of black or rich deep purple velvet, and profusely embroidered either in black or purple, to harmonise with the material of which the pardessus is made. Those for promenade are less trimmed, and much lighter, both in colour and material, drab and carmelite-brown cashmere being the most favourite colours, but all embroidered in colours to correspond. The pardessus is lined with sarsnet of full colours, principally red, and well wadded.



EMBROIDERED PARDESSUS.

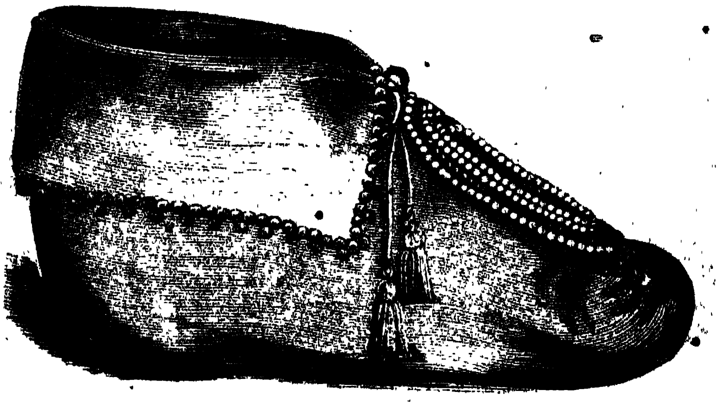
AN INFANT'S SHOE.

Materials.—A small piece of chamois leather, a little coarse crochet silk, or Russian braid, and a small quantity of beads, of various colours, the size usually called seed-beads, and a size larger. Also two short white bugles, or large beads, and a few gold ones.

We have great pleasure in presenting our friends with this elegant little novelty, which is infinitely better adapted for an infant's *first* shoe than any woollen fabric can be. Several medical men have assured us it is quite invaluable for keeping the feet warm, and being, at the same time, so soft and plastic. We may add that it is also extremely pretty, and washes and wears well.

The shoe is cut, in one piece, out of good chamois leather. It is in the form of a boot, being about three inches deep. It is sewed up the front to the instep, and the toe gathered in; the back of the heel is also sewed up. A bugle is placed at the toe, over the close of the gathers, with a few gold beads, forming a star round it. The seam up the front is covered by rows of beads of various bright, strongly-contrasting colours. They are laid on in the pattern in the following order:—The seam is covered by two rows of blue, these are surrounded by clear white, then a round of garnet, the next bright green, the outer row chalk white. The upper part of the leather, to the depth of an inch, falls over round the ancle, giving it additional warmth. It is trimmed with blue beads, *larger* than those on the front. The edges are not hemmed, as the turning over of the leather would make them clumsy; and the seams are made perfectly flat. The strings round the ancle are of braid, or of silk twisted into a cord, and finished with small tassels.

A shoe of about three inches and a half long will be found quite sufficiently large for the first size. It should be worn with a fine open-worked sock.



INFANT'S SHOE (BROUGHT FROM NORTH AMERICA).

HONITON SPRIGS IN CROCHET.

The beautiful and expensive lace for which Honiton is famous may be closely imitated in crochet, with the occasional aid of some of the point-lace stitches; we trust, therefore, that as lace is so much worn now in demi and evening toilette, a few specimens, given from time to time, will be acceptable to our fair readers.

Honiton sprigs and edgings are done in detached pieces, which are afterwards laid on Brussels net, and run on in any form that fancy may dictate. Sometimes they are connected together into a solid mass by means of twisted bars, in a manner termed *guipuring*. Being thus separate, the directions for each sprig or edging are comparatively short; we shall therefore give one or more whenever the space will permit. Each sprig is usually begun at the end of the stem, which is formed by a chain, any leaves or flowers that come on the right side of it being then made as you come to them; generally a flower forms the point of the spray, and this being made, the stem is finished by working the chain stitches in s.c., adding the leaves or flowers on the left side whenever they occur, and working down to the commencement of the chain. Leave about three inches of thread on beginning and ending; thread these with a fine needle, and run a few stitches up and down the stem, on the *wrong* side, to secure them. They may then be cut off closely, and the sprig is complete.

As these general observations refer to all imitations of Honiton lace in crochet, we shall beg our readers to refer to them, when directions for other specimens are given.

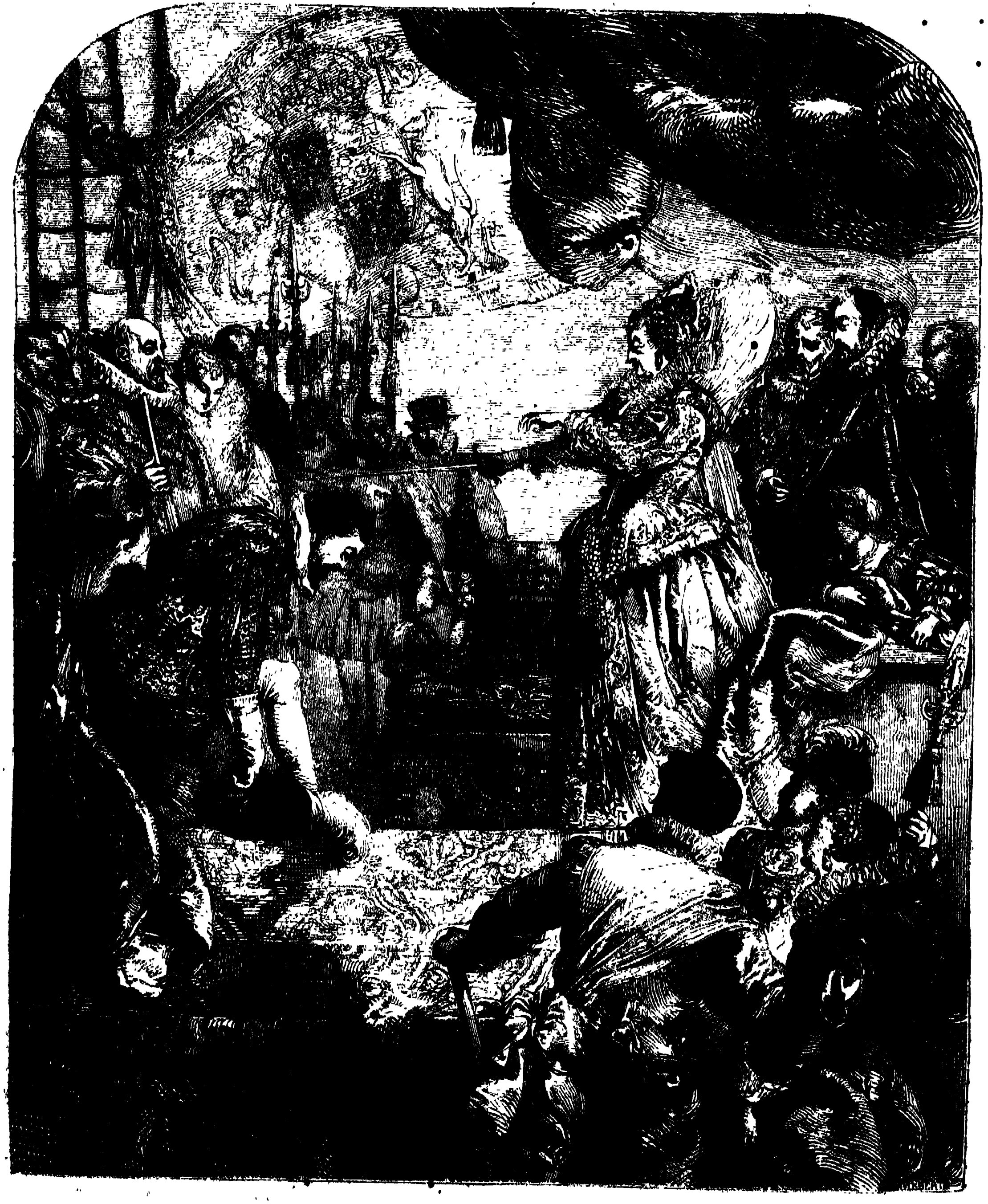
Materials. — Brooks' goat's-head cotton, No. 60; crochet-hook No. 24.

10 chain for stem; 15 for leaf. Of these, miss 1, slip on 2nd, 3 ch., miss 3, d.c. on 4th, 4 ch., miss 4, d.c. on 5th, 3 ch., miss 3, slip on the 4th. Thus 15 are used for the open hem of a long leaf. Work on the chain side to the point in s.c.; on the other side, 2 s.c., 2 d.c., 9 t.c. on 7, 2 d.c., 2 s.c. Slip at the end, 32 ch.; these are 6 for the stem, 6 for the calyx of the flower, and 20 for the centre loop of the last-named. Slip on the 13th of the 32, to close this loop, and work round it in s.c. Round this do 6 ch., miss 1, d.c. in 2nd; × 4 ch., miss 1, d.c. in 2nd, × 8 times; 6 ch, slip at the stem; s.c. all round, which completes the flower. For the calyx, slip-stitch down 6 of the 12 left, then work up the right side to the flower, 1 s.c., 5 d.c.; do 5 slip on the base of the flower, to the opposite side of the stem, and down it, on the 6 slip, 5 d.c., 1 s.c. The flower and calyx are now completed. 6 s.c. on stem, which brings the thread opposite the large leaf. 9 ch., miss 1, slip-stitch on the other 8. This forms the veining of a small leaf; work round it, 1 s.c., d.c. to the point, 3 d.c. in one at the point, d.c. down the other side, except the last, which s.c., 5 s.c. on chain; repeat this leaf; 5 s.c. on ch. This finishes the stem. Fasten off.

Unless particularly ordered otherwise, crochet sprigs are worked entirely on the right side, without turning the work. When a stem has to be crossed, pass the hook with the loop *above*, and the thread *below* it.

Honiton Edging: Laid on quilling net, for frills, infants' caps, &c.—*Materials* (as above). This edging is made all in one length. × 28 ch., slip on the 16th, so that the last 12 form a loop. × repeat for as great a length as required. This is the foundation.—2nd row, worked on this chain: s.c. round every loop, and on all the chain between.—3rd row, worked on the other side of the chain: × slip-stitch opposite loop, 2 s.c., 4 d.c., 3 ch., miss 3, 4 d.c., 2 s.c. × repeat throughout the length. Run it on the quilling net at the inner row, letting the loops lay on the net, and tacking them round. Finish with a row of very good pearl edging.

QUEEN ELIZABETH KNIGHTING DRAKE.



DESIGNED BY GILBERT.

The age of Queen Elizabeth was pre-eminently that of romance. The Reformation had come, and quickened many a manly heart. Great thoughts had been set loose, the printing-press had gathered them up, and the dramatist had married them to immortal verse. It was an age of wonder, and adventure, and action. Romance was not confined to the "Globe," where an admiring multitude nightly sympathised with Desdemona's untimely fate—with the loves of Romeo and Juliet—with the speculations of Hamlet, or the bitter sorrows of King Lear—but in all broad England it had a local habitation and a name. Then, as now, the sea had an especial charm for our hardy countrymen. Raleigh captivated all hearts by his tales of countries whose inhabitants' heads were placed beneath their shoulders, and by his reports of Eldorado, with its mountains of glittering gold. To win fame, and wealth, and honour, on the ocean wave, was the object of universal ambition; and for this stout hearts bravely left their native shores, and became pioneers for their countrymen to many a then-untravelled land. And well might those hearts be stout and brave, for then Spain was a colossal power; then her flags fluttered in every breeze—her ships floated on every sea; and on no country under heaven's broad light did Spain look with so fervent a hatred as upon

"This precious gem, set in the silver sea."

Then it needed brave hearts to dare alike the perils of the treacherous Spaniard and the stormy main. However, in those days men had brave hearts; and one of the bravest of them belonged to Francis Drake—a name precious so long as the memory of Englishmen shall live.

Francis Drake, "born," as he told Camden, "of mean parentage, in Devonshire," was placed, as a youth, with the master of a bark, accustomed to coast along the shore, and sometimes to carry merchandise into Zeland and France. So pleased was the old man by his industry, that, being a bachelor, he bequeathed his vessel unto him by will and testament, a circumstance, as Dr. Johnson remarks, "that deserves to be remembered, not only as it may illustrate the private character of this brave man, but as it may hint to all those who may hereafter propose his conduct for their imitation, that virtue is the surest foundation both for reputation and fortune, and that the first step to greatness is *to be honest.*"*

Young Drake appears for some time to have carried on the same course of traffic as his late master. But a "new world" had recently been discovered, and nothing was talked of, among the mercantile or adventurous part of mankind but its beauty and its wealth. Fresh discoveries were frequently made; countries and nations, till then unknown, were daily described; nor did the relators suppress or diminish any circumstance that might excite the curiosity of their auditors, or overwhelm them with astonishment. Stimulated by these circumstances, the narrow seas Drake had been accustomed to navigate appeared far too limited for his capacious and aspiring mind. He, therefore, sold his bark, by the advice of a bold and adventurous seaman, Captain John Hawkins—who is styled his "kinesman"—and embarked all he had in a venture with him to the West Indies. But the result proved to be disastrous, and both appear to have narrowly escaped with their lives.

Spain was now extorting, by most unjust and tyrannical means, from the unhappy princes of Mexico and Peru, the wealth, which enabled her to domineer over a large portion of Europe; and most treacherous was her conduct towards the adventurers in recent voyages, and to other traders, to the West Indies, and the coasts of the Spanish Main. The indignation of multitudes, and especially of the mercantile and sea-faring community, was, consequently, enkindled, and a loud cry arose for summary vengeance on the atrocious oppressors of the New World. Drake, therefore, undertook a voyage to the West Indies, and gained the very spot from whence the immense quantities of gold and silver, the produce of Peru and Mexico, were formerly accumulated and shipped for Spain. The reports of his perils and adventures, faithfully given by others, and revised by his own hand, cannot here be given. In the course of this expedition he reached a famous tree, in the trunk of which were cut divers steps, to facilitate the ascent, almost to the top, while in the midst of the branches had been constructed a convenient arbour, in which twelve men might sit, and from whence might plainly be discerned both the North and South Atlantic Oceans.

The view of the great South Sea, which now fired afresh the mind of Drake, was not, however, the first discovery of that "world of waters," this having been previously made by Vasco Nunez de Balboa. Nor could the vow by which he bound himself to navigate the sea be then performed; but he returned from his voyage with a "pretty store of money," from capturing the town of Vera Cruz, and making prize of a string of mules laden with silver. With a part of the profits of this voyage he fitted out, it is said, three stout "frigates," but actually three pinnaces, moved by sails and oars, and served as a volunteer in Ireland, under his friend Walter, Earl of Essex, "where he did excellent service, both by sea and land, at the winning of divers strong forts" This enterprise was not crowned with success; but it undoubtedly led to the establishment of Drake's future reputation, by the introduction it procured for him to Sir Christopher Hatton, then Vice-Chamberlain, and by him to the Queen, who, being apprised of his adventurous expedition and success against her bitterest enemy, gave him a most flattering reception, and encouraged him to follow up his attacks on the Indian colonies of Spain.

With five small ships, the largest of one hundred, the smallest teen tons, and the average of the whole only fifty-five tons, he now started on his voyage round the world, which had only been once performed, by Magelhaens, and was "accounted so terrible in those days that the very thought of attempting it was dreadful." The little squadron left Plymouth on the 15th of November, 1577, and on the 23rd of August, Drake came to the mouth of the Strait of Malgelhaens, an inland sea, thick set with islands, and enclosed with high cliffs and mountains, which in that latitude render the air extremely cold, the summits being covered with snow. "At the cape forming the entrance," says the narrator of the voyage, "our general caused his fleet, in homage to our Sovereign Lady the Queen's Majesty, to strike their top-sails upon the beach, as a token of his willing and glad mind to show his dutiful obedience to her highness, whom he acknowledged to have full interest and right in that new discovery; and withal, in remembrance of his honourable friend and favourer, Sir Christopher Hatton, he changed the name of the ship, which himself went in, from the Pelican to be called the Golden Hind." And the fact is indeed remarkable, that in sixteen days the little fleet, now reduced to three vessels, passed through this most intricate and troublesome navigation, which one of our square-rigged ships usually requires a fortnight to accomplish, notwithstanding all existing improvements in vessels, nautical instruments, and the theory of navigation.

On the 16th of September the mariners entered into the open South Sea, where a terrific tempest arose, in which one of the vessels was lost, with all on board, and another entered the Strait of Magelhaens, and nothing more of it was heard. Deprived of his ships, his companions, and a great part of his crew; driven by a succession of storms to the very southern extremity of the great continent of America, which had never been visited by any civilised human being (for he was the first to discover Cape Horn); tossed about on a sea utterly unknown, and suffering grievously in his own person, Drake's situation now seemed desperate. But, a genial breeze springing up from the south, he sailed to the north-west, visited various places, and arriving on the 7th of February, 1578, before Africa, he took some barks laden with about eight hundred weight of silver. A few days after he entered the port of Lima, and with extraordinary temerity, which was regarded only in panic or cowardice, he plundered seventeen loaded ships, without the slightest attempt being made for their rescue or defence. Chasing a richly-laden vessel, called "the Great Glory of the South Sea," he took from her spoils calculated in value at 360,000 pieces of eight, or nearly £90,000, and let her go. While on his way he boarded a brigantine, out of which he took eighty pounds of gold.

He now continued his voyage, and, keeping close to the coast of North America, refitted his vessel in the port of Aguapulca. He boldly resolved to try whether he could not reach home by proceeding to the north-east, but only to fail, as others have done since, in solving this momentous problem of navigation. He visited the natives of the west coast, and, from the white cliffs which he observed on it, he gave to all the land he had seen in this part of America the name of New Albion, in honour of his own country. "There is reason," says Burney, "to conclude, that the Port of Drake was that which is now known by the name of Port San Francisco." Proceeding to the Pellew Islands, Drake afterwards made the Philippines, and appears to have gained golden opinions from all with whom he met at Ternate, the capital of the Moluccas. "It is impossible," says Sir John Barrow, to whose "Life of Drake" we are greatly indebted, "not to admire the boldness and skill of this able navigator, steering his solitary vessel through unknown seas, without a pilot and without a chart (for the only one he had was from the coast of America to the Philippines)—to conduct his little ship in safety thus far through an intricate navigation, among rocks and islands, far more intricate even than the passage through the Strait of Magelhaens." But, on the night of the 9th of January, 1580, running under all sail set, and the wind blowing moderately fresh, the ship all at once struck on a rocky shoal, and stuck fast. In this imminent peril it was lightened, but only of that part of the cargo which was of little value; and when the ship slipped off from the ledge of the rock, and floated into deep water, Drake proceeded to Java, subsequently put to sea for the Cape of Good Hope, and on the 26th of September, 1580, arrived at Plymouth, where he was *fêted* for some days by the authorities and the neighbouring gentry.

He afterwards set sail for Deptford in the ship with which "he ploughed up a furrow round the world;" and on the 4th of April, 1581, received on board her Majesty, who conferred on the illustrious navigator the honour of knighthood. The Queen expressed herself strongly that the Golden Hind should be preserved as a striking monument of his own and his country's glory; and it remained in Deptford Dockyard, the object of great curiosity and admiration, during a long series of years.

TUNNELLING THE ALPS.

Hannibal and Napoleon have acquired immortal renown by leading great armies *across* the Alps, but what shall be said of those who propose to bore through them? The project does not appear to be by any means impracticable. Engineers gravely examine it, and report that it may be carried into execution; and after the Crystal Palace, and the Menai Bridge, and the Thames Tunnel, who will venture to disbelieve them?

To complete a direct line of railroad communication between Boulogne, Venice, and Ancona, and consequently between London and the Adriatic, only one obstacle lies in the way. The chain of Mont Cenis and Mont Genèvre, running nearly north-east and south-west, would cross such a line, and present, with the elevation of 11,000 feet, an insurmountable bar to any direct and continuous railway. The railway can, with some difficulty, be made to Modane, at the foot of the northern crest of the Graian and Cottian Alps; but here it must stop, unless a subterranean passage can be found through the mountains, and a project for doing this has been for several years under consideration by the Sardinian government. Chevalier Henry Maus has devoted much study to making the examinations and calculations, and has invented a new boring machine for the purpose of carrying out the plan. He made his report early in 1849, and a commission of engineers, army officers, and geologists, was appointed to examine into the feasibility of the project. Their report, illustrated by maps, has just been published, and an application for a part of the funds to begin the work will be made forthwith. The tunnel is expected to cost about £600,000, and may be finished in five years. It will measure 12,290 metres, or nearly seven miles in length. Its greatest height will be 19 feet, and its width 25, admitting, of course, of a double line of rail. Its northern entrance is to be at Modane, and the southern entrance at Bardonnèche, on the river Mardovine. This latter entrance, being the highest point of the intended line of rail, will be 4092 feet above the level of the sea, and yet 2400 feet below the highest or culminating point of the great road, or pass, over the Mont Cenis. It is intended to divide the connecting lines of rail leading to either entrance of the tunnel into eight inclined planes of about 5000 metres, or 2½ English miles each, worked like those at Liege by endless cables and stationary engines, but in the present case moved by water-power derived from the torrents. At one point there will be 4850 feet of mountain, capped with eternal glaciers, overhead. Ventilation must be maintained by forcing air in and out by mechanical means.

The newly-invented machine, which it is proposed to use, consists of two large hydraulic wheels, 18 feet in diameter, which move two pulleys (with an endless cable passed twice round them) placed horizontally, and of 30 feet diameter, performing 22½ revolutions per minute. There is also an endless cable connected with the excavating machinery, to move at the rate of 35 feet per second, and a counterpoise or weight to keep the cable in a proper state of tension at the opposite end of the hydraulic wheels, and to travel on a waggon between these and a great well, sunk to receive a corresponding weight at the end of a rope. The machine, once presented to the rock, projects into it simultaneously four horizontal series of sixteen scalpels, working backward and forward, by means of springs cased in, and put in operation by the same water-power. While these are at work, one vertical series on each side works simultaneously up and down, so that together they cut out four blocks on all sides, except on the rock behind, from which they are afterwards detached by hand. During the operation, a squirt-pump throws out a jet of water between each pair of scalpels, to prevent the heating of the tools, and to wash out the rubbish. After their complete separation, the blocks are pulled out by the help of the endless cable, and received in a waggon, to be drawn from the tunnel. The machines are only to cut a gallery 13 feet wide and 7 feet high, which is afterwards to be enlarged by the ordinary means to the size mentioned above. It has already been ascertained that each of the two machines, at the opposite ends of the tunnel, will excavate to the extent of 22 feet per day, and it is to be estimated that the whole excavation will be completed in four years. The rocks which it is supposed will be met with are gypsum, limestone, and quartz in veins.

Of the effects of such an undertaking there can be but one opinion. It would form a new highway for the diffusion of moral and political blessings all over the continent. The very fact that the idea originated in Sardinia is a striking instance of the good that is wrought by a free government, and presents a brilliant contrast to the gloomy rule of the Papacy, which totally prohibits the formation of railways in the States of the Church. We greatly fear, however, that the recent convulsions, the predominance of absolutism all over the continent, and the unconquerable repugnance of Austria to everything progressive, whether national or social, may prevent, or at least greatly retard, the execution of the project.

THE BROTHERS LE NAIN

FRENCH PAINTERS OF THE SEVENTEENTH CENTURY.

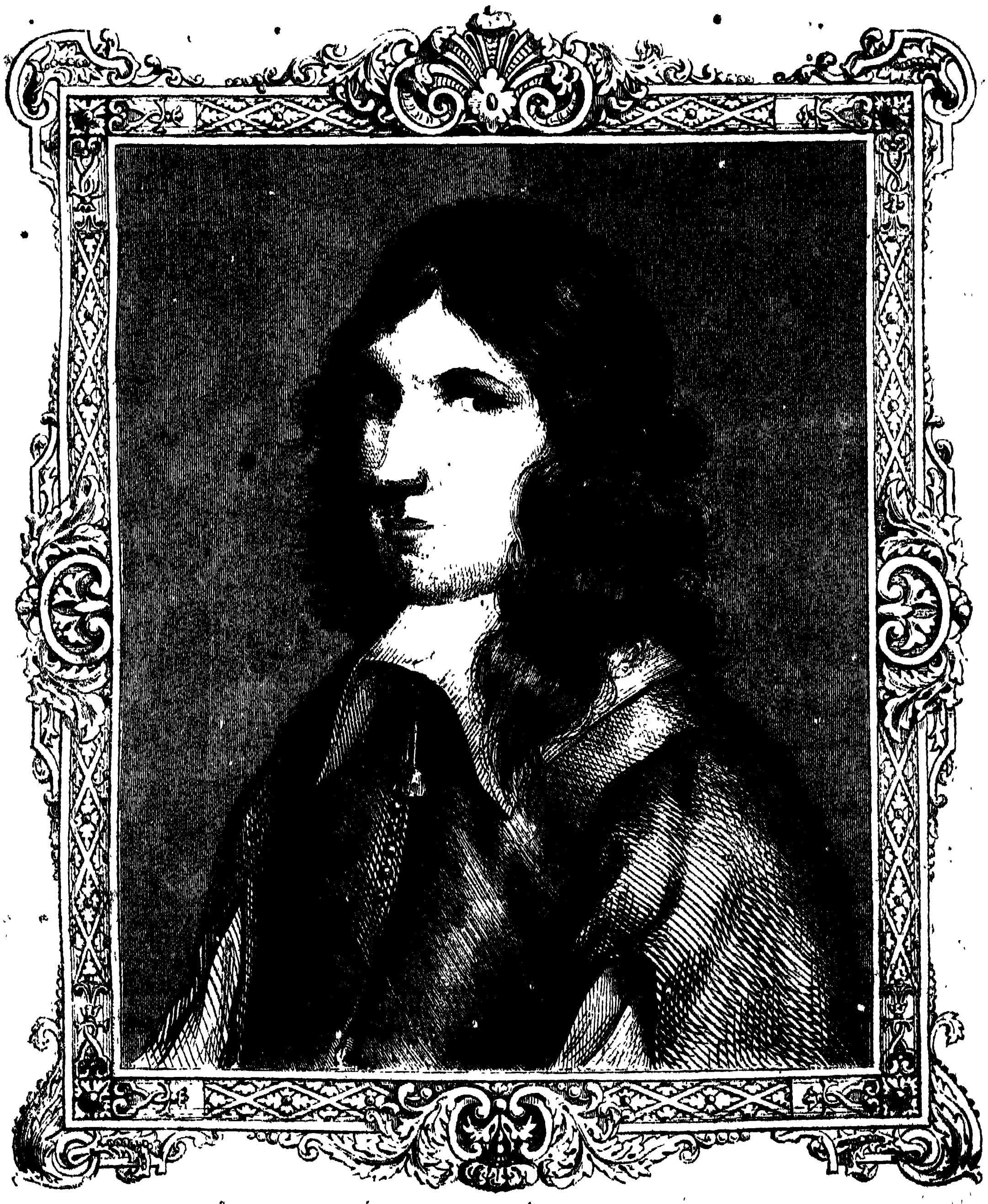
Three artists, bearing the name of Le Nain, appeared in France about the middle of the seventeenth century. The leading feature in all their works is simplicity and trueness to nature, and in these respects they present a striking contrast to those of their contemporaries, who, for the most part, had followed the conventional style of Vouet and Lebrun. It is impossible to mistake the paintings of the Le Nains for those of any other artist. They are all marked by the same leading features—the same close attention to the effects of light and shade—the minute accuracy of detail—and the same scrupulously-exact imitation of nature.

Strange to say, however, very few can say to which of the brothers any of their works still extant belongs; or, in vulgar parlance, can pronounce with certainty "which is which." So few and imperfect are the accounts which have come down to us, that nothing is known of those little differences of style which might enable us to distinguish the works of one of them from those of the others.

Antony and Louis Le Nain were born at Laon, the former in 1588, and the latter in 1693. They painted rustic scenes in low life in the French style, and so entirely similar was the results of their individual labour, that it was impossible to distinguish any difference in the parts which each had done in the same painting. They worked in common, and no picture ever issued from their studio in which both had not a hand. Their finish was exquisite, and they had great skill in the mixing of colours. Their whole lives were spent in perfect harmony of sentiment and pursuit, and in death they were not divided. Louis died on the 23rd of May, 1648, and Antoine two days afterwards, on the 25th of the same month. They proposed taking part in the establishment of the *Academie Royale*, but their decease prevented their putting their design into execution.

The Chevalier Mathieu Le Nain was born at Laon, in 1607, and died at Paris in 1677. He devoted his attention almost exclusively to portrait painting, and in that character was admitted a member of the *Academie Royale*. Whether he was in any way related to the two brothers, Louis and Antoine, is unknown, but he came from the same town, and there is every probability that he belonged to the same family. This meagre sketch is the only account which has come down to us of these artists or their works; and what renders the obscurity still greater, no engravings were taken of any of their paintings during their lifetime. It was not until a century after their death that eminent English and French engravers—such as Beauvartet, Daullé, Elisabeth Cousinet, Lebas, Bannerman, Earlom, Mitchell, Baillie—endeavoured to render the public familiar with their works. But the engravers as well as the historians have left no mark by which the works of each of the three artists may be distinguished. The surname only, Le Nain, is attached indiscriminately to all.

At this period their works were eagerly sought after, and were to be found in all the best collections of the connoisseurs of the day. Of the paintings of the Prince of Conti, sold in 1777, seven were by Le Nain, one of which, the "Farrier in the Forge," was bought for 2,460 livres. This is at present in the Louvre.

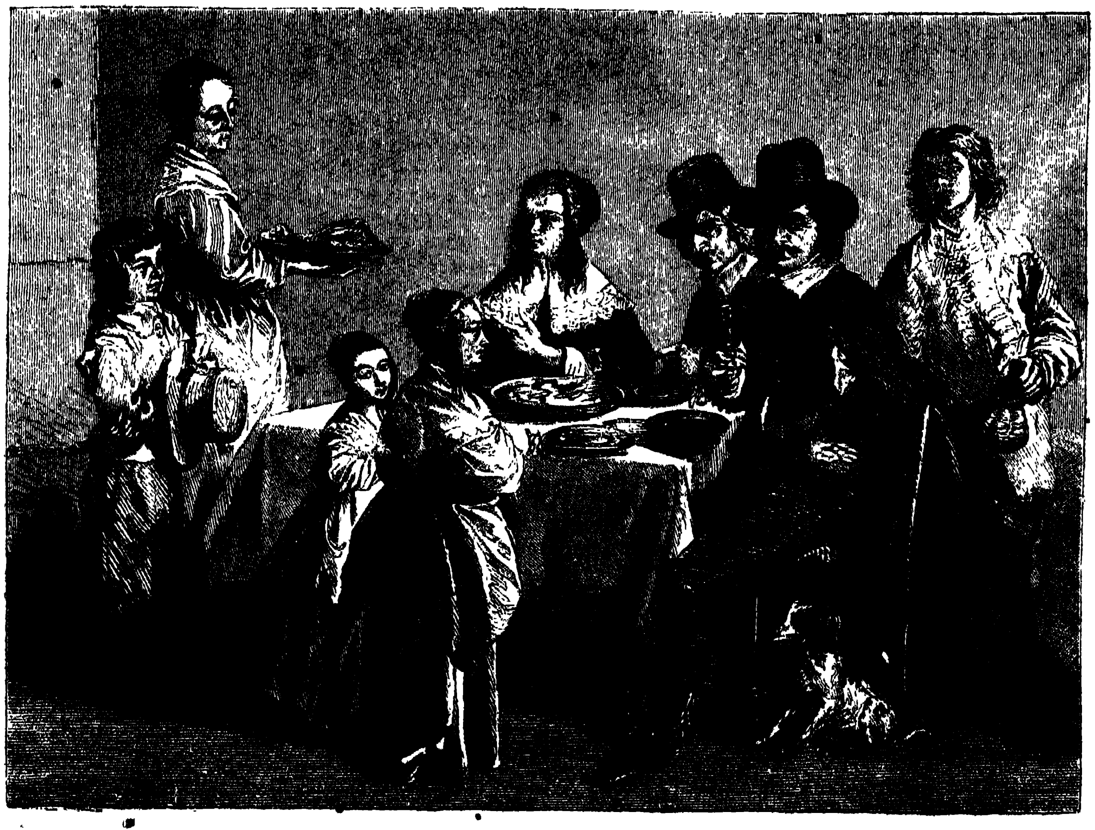


LE NAIN, FROM THE ORIGINAL PAINTING IN THE MUSEUM OF PUY.

In an essay recently published in France upon the Le Nains and their works, some additional light has been thrown on the subject in the shape of extracts from a MS. written by a Benedictine monk named Grenier, who occupied himself for many years in the collection of curious information relative to the province of Picardy. He says, "Louis and Matthieu Le Nain were the relatives of Gilles Le Nain, vicar of the parish of St. Peter. It is said they were taught painting at Laon by a stranger for one year, and then proceeded to Paris to complete their studies, where they lived in the same house. Antoine was the elder. He was formally acknowledged a painter on the 16th of March, 1629, in the hall of the Abbey of St. Germain, by the Sieur Plautin, an advocate, who was bailiff of the place. The two brothers were the same day elected members of the Royal Academy of Painting and Sculpture. Their letters of reception are dated March 1, 1648, and are signed by the celebrated Lebrun. Most of the paintings in the town of Laon are attributed to one of them—the 'Last Supper' in the chapel of the Queen's Church in the great square, and the painting over the high altar of the church of St. Benedict."

The "Family Repast," of which we present an engraving, was part of the collection of the Duke de Choiseul, and was sold for 2,300 livres in 1772. A similar painting was in the possession of Poullain, the Receiver-General of the Royal Domains. It gives a better idea of the peculiarity of the style of Le Nain than the "Farrier in the Forge." It may safely be compared to any of the great works of the German and Dutch school. It has all the force and truthfulness of Ostade and Craesbecke, with the grace and precision of Cattol and Abraham. The features and costume of the two burghers remind one of the great Corneille, and Hooch would not be ashamed of the valet who stands behind them. The stiff mother, in her starched collar, scolding the boy, who is crumpling his hat in his hands —the two other children — and the servant beside all—have an air of inimitable simplicity. When to all this we add the exquisitely-harmonious distribution of light and shade, we cannot feel surprised that the works of the Le Nains are so highly prized. But it is a curious circumstance that very few of them are now to be found in France. They are scattered through all parts of Europe. Some are in the possession of the Duke of Sutherland and the Marquis of Bute; others are to be found in the Grosvenor Gallery, in the Museums of Schleissheim and Ludwighurst, in Germany; in the Hermitage Gallery in Russia, and the celebrated Gallery of Florence, in Italy.

The portrait of Le Nain has never been published. The engraving we give is from a sketch taken from an original painting in the Museum of Puy, in the department of the Haute Loire, in France. At all events, it is certain that this likeness of one of the Le Nains is due to the pencil of one of them. The whole portrait breathes of their manner. The direction of the eyes, the careless costume, speak of self-portraiture. It is a half-length, representing a man of about thirty years old, with long and thick brown locks, flowing down to his shoulders. The eyes are dark, keen, observant; they remember what they see. The purpoint is plain, and void of all foppery. The simplicity, which is a characteristic of all their paintings, was, if possible, still more rigorously observed here. Matthew had principally devoted himself, as we have already seen, to portraits, often historical; this historical portrait is, therefore, likely to be at once his work, and the likeness of no other than himself. The familiar subjects are thus probably the productions of his two brothers, in most instances.



THE "FAMILY REPAST," FROM A PAINTING BY LE NAIN.

THE GREAT WESTERN RAILWAY COMPANY'S LOCOMOTIVE FACTORY AT SWINDON.

JUST for a moment before we enter this large establishment, of which the title has now been given, let us, in imagination, roll back about a quarter of a century, and place ourselves in the year 1825, in a committee-room of the House of Commons. The matter under discussion is the Liverpool and Manchester Railway Bill; and the gentleman who is now being examined is asked whether a locomotive could travel *safely* at the rate of five or six miles per hour. To this he replies, that he thinks even *double* that rate may be attained, and adds that he proposes to travel at the rate of *eight* miles per hour with a burden of twenty tons, and *four* miles an hour with forty tons. And what effect did these statements produce? They were laughed at by some, and positively disbelieved by others. And yet that gentleman was GEORGE STEPHENSON

The improvements which have been of late effected in locomotives are too numerous to be now detailed. "The Rocket," of five or six tons weight, which cost £550, and gained the first prize on the Liverpool and Manchester Railway, has been gradually superseded by the six or eight-wheeled engines, of £2,500 or £3,000 each, and of twenty or thirty tons, the tenders of which alone cost almost as much as the earlier locomotives. While the "Rocket" was required only to propel a load three times its own weight, a "modern" engine will convey thirty passenger carriages, averaging five tons and a half, at a speed of thirty miles an hour. We have, indeed, been told, by the secretary of the Great-Western Railway, that the express-trains, when in motion, proceed at the rate of from seventy-five to eighty-five miles an hour, and that the goods-engines are capable of conveying five-hundred tons at the speed of twenty miles an hour!

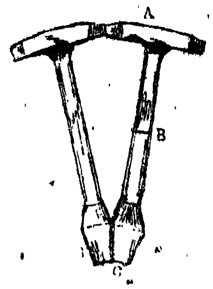
The Railway Factory at Swindon consists of two large squares, surrounded by workshops, with one or two smaller squares adjoining. In connection with this establishment there is also an engine-house—where locomotives not immediately wanted are kept, like horses at livery, except that they require no food—and a building resembling a veterinary college, where any constitutional defect is corrected, and any local injury repaired. There are, moreover, two shops for the manufacture of iron-trucks and the iron-work of carriages, with which, at present, we have nothing to do. The locomotive department, to which the present remarks will be restricted, has room for no fewer than 3,000 men to work, though this number has never yet been reached.

In describing the movements of a locomotive establishment of such magnitude and extent, we begin, as is desirable, with the simplest part—the Smithery: a long range of buildings, containing the astonishing number of 176 forges, with all the appliances required for their full efficiency. Here, all the parts of a locomotive, which are of *wrought*-iron—as axles, piston-rods, connecting-rods, and the smaller pieces, which seem almost innumerable, are produced. All the various processes of a very complete smith's-shop are constantly passed through. One branch of this department is appropriated to the spring-makers, who forge and nicely temper the parts of which a spring is composed, and then fasten them together by an iron band.

From hence we proceed to observe the forging of the largest works of a locomotive. As an ordinary fire is inadequate to heat the huge masses of iron employed in their production, there are three furnaces. One of them is used in melting the scraps of iron that come from the lathes and the fitting-shops in general; these hard substances yielding to the heat thus maintained as readily as the "kitchen stuff" of the cook does in the vat of the tallow-chandler, and becoming no less fully prepared to receive any form that may be desired. Close to the furnaces are two of Nasmyth's steam-hammers, which are invaluable in forging large masses of iron. Of these powerful, yet easily-manageable, machines, nearly four hundred have been constructed, and are in action not only in England, but in various parts of the earth. Before they were introduced, the forging of huge masses was not only a tedious, but doubtful process; but now a sufficient force is brought into operation to give them the required solidity, and the consequent security to their future use. Our illustration shows the back of one of the furnaces, with the opening through which the men put the coal; the crane by which the iron, however huge it may be, is brought to the steam-hammer, and that vast congeries of "sledge-hammers" itself, which works on unwearied from day to day, and from year to year. It is here represented as forging the half of a crank-axle. And most important, indeed, is this part of its service; for on the crank-axle the driving wheels of the locomotive are put, and to it the propelling power that is necessary is applied.

It is curious to observe how completely the steam-hammer is under the control not merely of a man, but a boy, who can cause it to descend with the weight of many tons, or with so gentle a force that a nut may be cracked, and the kernel suffer no injury. But, in forging a crank-axle, great power is required. An oblong mass of iron has a square piece cut out of it from one end, the remainder of it is then slightly rounded, and afterwards the other end is similarly treated; the result being an oblong mass of iron with a roughly-rounded piece at each end. Two masses having been shaped in this way, they are welded together, after being brought to a white heat in the furnace—the two oblong pieces being placed at right angles.

Another remarkable process is that of wheel-making. On the importance of this part of a locomotive it is unnecessary to expatiate. The breaking of a wheel under the old coach system, suggests all the ideas of a frightful accident; but how are they increased and intensified in connection with such a catastrophe on the rail! Against it, therefore, every possible precaution is taken. Very recently the spokes were arranged in the form of arches, each arch being produced from a bar of wrought iron, and then so placed as to form a complete set of spokes. These were all united by the nave, which was cast solid. But now the whole of a railway wheel consists of wrought iron, and the process of its construction will be clearly perceived in connection with the diagram. The first thing forged is a piece of iron, in shape like A B; another piece, shaped like B C, is then welded to it, and the two united form a spoke, with part of the circumference of the wheel. This process is repeated till the requisite number of spokes are made, which are successively welded together. In the large eight-feet driving-wheels there are 24 spokes.



Our illustration in the first centre page shows the next operation. The wheel is exhibited as being heated for the welding of the outer parts. In the furnace to the left, the piece of iron is being prepared for insertion in the gap that requires to be filled. No ordinary heat will suffice for such processes. There is therefore a scene of wild magnificence when one of the smiths stirs up the fire, which throws up sparks to the height of many feet, and casts a bright but lurid glare over the rough countenances and herculean forms of the surrounding artisans. On the wheel being completely welded, two pieces of iron are placed on the upper and lower part of the nave, to give it solidity and strength.

The tires of the larger wheels are made in two pieces, which are then welded together. For the smaller ones the following course is adopted:—A bar of iron rolled into such a shape that its section forms a right angle, is raised in the furnace to a red heat; one end of it is then secured by a staple to a circular mandril of the size required, and the bar is gradually bent round it, staple after staple being added to keep it in its place, until the extremities meet or nearly so, when, wedges being driven between them at a welding heat, the two portions are united, and the tire of a wheel is completed. A wheel consists of a hundred and one pieces.

The illustration to the left of the one last named shows the furnace in which the tires are heated, and, in the foreground, the process of expanding any that are made too small. They are placed on an iron floor, on which there is a kind of skeleton wheel, the circumference of which the men extend by means of a handle shown in the engraving. If, on the contrary, any tires are made too large, they are reduced by hammering, to fit this wheel.

The boiler-house must now be visited. The boilers are made of sheet-iron, duly prepared for this purpose. When brought to their proper size and shape, the plates have to be drilled or punched, so that holes may be made for the rivets which are to bind the various parts of the boiler together. The process for doing this may be observed in our illustration. It exhibits a furnace, in which a boy heats small iron rivets, which are simply round pieces of iron, each having a head at *one* end. Taking one of these heated rivets in a pair of pincers, he runs to the boiler which the men are engaged in constructing, and thrusts it into its destined hole, placing its head *inside* the boiler; against this a man standing within presses firmly with a hammer, while without two lusty workmen ply their hammers so effectually, that the end of the rivet is rapidly transformed into another head, so that between the *two* heads the boiler-plates brought into previous contact, are firmly held together. In this way rivet is added after rivet, until all that are necessary to make the adhesion of two plates complete, either throughout their length, or width, or both, is skilfully effected.

Sir F. Head naturally and forcibly says, when referring to similar circumstances: "As for asking questions of, or receiving explanations from, the guide, who with motionless lips conducts the stranger through this chamber, such an effort would be utterly hopeless, for the deafening noise proceeding from the rivetting of the bolts and plates of so many boilers is distracting beyond description. We almost fancied that the workmen must be aware of this effect upon a stranger, and that on seeing us enter they therefore welcomed our visit by a charivari sufficient to awaken the dead." And then, describing men similarly engaged to those who have just been noticed, he adds: "The noise which reverberated within this boiler, in addition to that which was resounding without, formed altogether a dose which it was astonishing the tympanum of the human ear can receive uninjured; at all events, we could not help thinking that, if there should happen to exist on earth any man so ungallant as to complain of the occasional admonition of a female tongue, if he will only go by rail to Crewe"—Swindon will do as well—"and sit in that boiler for half an hour, he will most surely never complain again of the chirping of that 'cricket on his hearth'—the whispering curtain lectures of his *dulce domum.*"

The chief object observable in the engraving employed to illustrate this part of the subject is a boiler, nearly completed, and soon to leave the workship. At the right may be perceived the *fire*-box, and at the opposite extremity the *smoke*-box, to which a chimney is appended; the round spaces, which are hereafter to be occupied by the cylinders, may be distinctly observed.

Leaving the boiler-house, we enter the foundry, the region of products in *cast*-iron—those already described being in *wrought*-iron. Here the cylinders and surrounding parts of the fabric of a locomotive are formed. Here, too, the ornamental portions, the cocks, and whistles, are cast in brass. For the foundry, however, much narrower limits suffice than for the other departments of the establishment through which we have passed. Immediately adjoining the foundry is a shop where the woodwork of the buffers of a locomotive is made; here also are the pattern-makers, the persons who make models in wood—and that with great dexterity and nicety—of whatever is intended to be cast in moist or dry sand, and that either in iron or brass. This mode is adapted in all the finer kinds of work, and it is now mentioned because, in the production of larger articles, and where a rough surface is of no consequence, the melted metal is poured into moulds of loam, when patterns are only partially, or not at all, used.

Near to the foundry is a yard, where are stowed away old cylinders, over which has gathered a thick coating of rust—the accumulated garments, in fact, of many successive seasons, and where are heaped together, it might be supposed, all the possible varieties of the odds and ends of old iron. Many pieces are ready to be immediately transferred to the furnace, which, in due time, will pour them forth in a liquid flood, but others are required to be first reduced in size, and for this purpose they are submitted to the *gentle* influence of a mass of iron, weighing about two tons, which, being raised by a windlass to a considerable height, is suddenly let fall, and crushes them in pieces.

The fitting-shops now demand a visit. To supply the power necessary to put in motion the numerous machines in the factory, there are two powerful engines—one by Stothardt, with 21-inch cylinders; and, at the other end of the buildings, is an engine with 30-inch cylinders, by Harvey and Co. In the lower turning-shop, the first we enter, the axles, crank-axles, and other large parts of locomotives, are finished.

The illustration at the top of the second page of engravings represents the slotting-machine, one of the almost invaluable machines of Messrs. Whitworth, of Manchester—the one now exhibited is, we believe, the largest they ever made. Our readers will remember the state in which a crank-axle was left by the steam-hammer, and this machine is employed to cut, from the solid metal, a hole or aperture, for the admission of the connecting-rod. The process by which this is done will be easily understood. The tool which is represented in the engraving, just above the axle, is moved regularly up and down by appropriate machinery, while the table on which the crank-axle rests is simultaneously advanced, so that the tool may constantly find a fresh portion of the metal which it has to remove; and all the manual attention required is to keep up a supply of soft-soap and water, to prevent the tool from becoming too hot. In this way an aperture in a crank-axle is completed in about twelve hours; but the time and means employed are amply compensated by the additional strength that is thus secured over the former practice, in which the crank-axle was constructed with the hole.

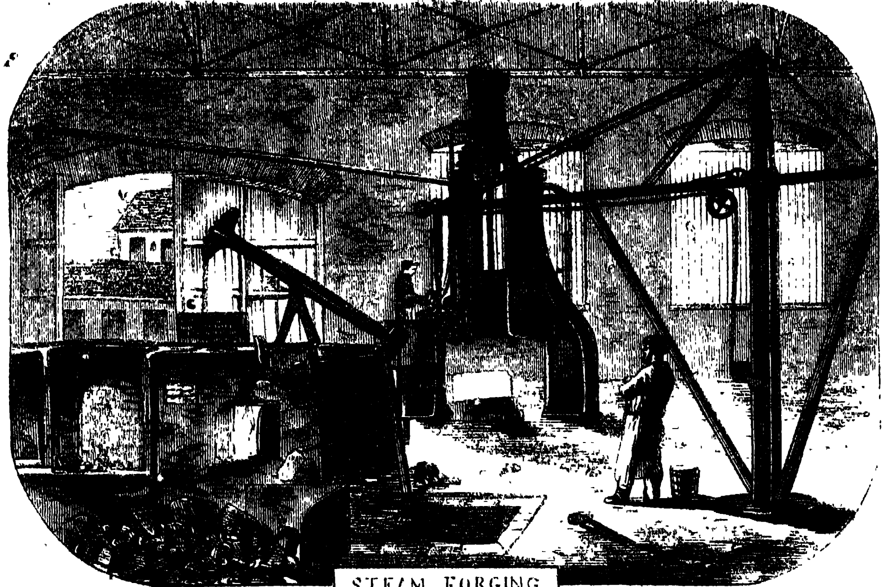
After the slotting-machine has thus acted on the crank-axle, it is removed to one of the large lathes, in which state it is shown at the bottom of the page. Here it revolves, coming in contact with a tool, which is gradually moved forwards and backwards against the part to be turned, by means of an ingenious machine called a "slide-rest;"—a great improvement on the old practice, which required the tool to be firmly grasped by the turner, while the upper part of its long handle rested on his right shoulder. A can of water, elevated just above, keeps up a succession of drops on the part being turned, the heat of which speedily converts the water into steam. By this process of turning, the crank-axle appears in contrast at this part to its former rude condition; it becomes not merely smooth, but bright too; the slide-rest acting with the greatest nicety. The tool often produces an iron-shaving, as bright as silver, extending not merely to many inches, but to several feet in length.

At one end of the same shop is the machine for boring cylinders, of which an illustration will also be observed. This process requires even less attention than the slotting-machine, as the tool pursues its slow, but steady and unerring course *inside* the cylinder, and needs only the application of oil about once in an hour. Each cylinder has two borings: the first at the rate of about two inches an hour, and the second at the rate of about an inch and a half. It need scarcely be remarked that the iron bar, seen in the drawing as passing through the cylinder, has the cutters sliding along it to bore the cylinder, but which, of course, are not visible from without.

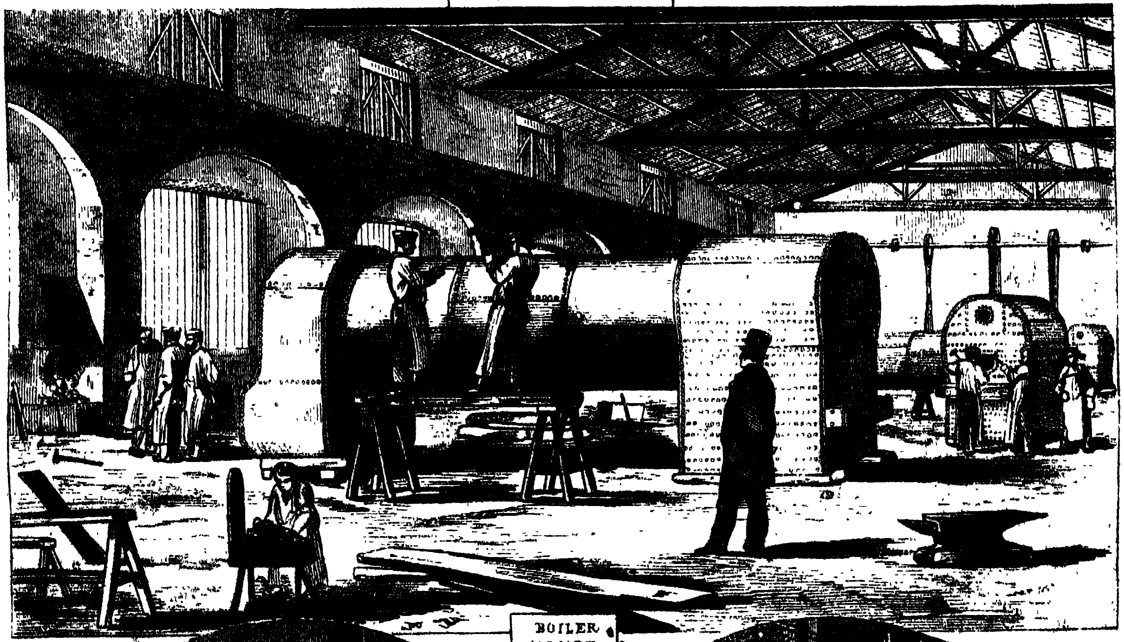
At the opposite end of the shop appears the hydraulic-press, by means of which the wheels of a locomotive, however large or weighty, are unrelentingly forced on their appointed axles. Our illustration also shows one of the large lathes for turning eight-feet wheels, and also the machine for grinding steel tires, both in a fitting-shop somewhat distant from the one which has now been described. Above this shop is another, in which all the smaller and lighter parts of a locomotive are turned, in about forty-five lathes, of a proportionately lighter description than are required for the heavier work. At the end of this shop is a door, leading into the brass-finishing shop, the name of which describes the processes carried on. There is yet another, called the grinding-shop, for many parts of a locomotive that were formerly finished by filing, are now ground; and adjoining this is the coppersmith's-shop, in which the feed-pipes and similar parts are made.

Finally, there is the erecting-shed, in which all the parts of a locomotive, consisting of no fewer than 5,416 pieces, are put together. To the left, in the foreground of the engraving, may be seen one of the large eight-wheeled locomotives, similar to that noble specimen of art, "the Lord of the Isles," which many people at the Crystal Palace supposed was merely for show, not knowing that three like it are actually running on the Great-Western Railway. The Colossus that now catches the eye needs only the aid of the painter and varnisher to be fully prepared to run, in its best attire, its mighty course. To the right, on a level with this locomotive, may be observed a half-finished goods-engine, which is readily distinguished from one intended for passengers by its having the wheels of equal size. As we look towards the other end of the shed, there will be perceived a row of locomotives in different conditions, and some as mere bodies. Midway, however, between the roof and the floor, is a traversing-table, running from end to end of the building, and used for the *very light* work of lifting up engines *bodily*, to put under or take away their wheels. This stupendous result is attained by means of a hydraulic apparatus, holding from eight to ten gallons of water!

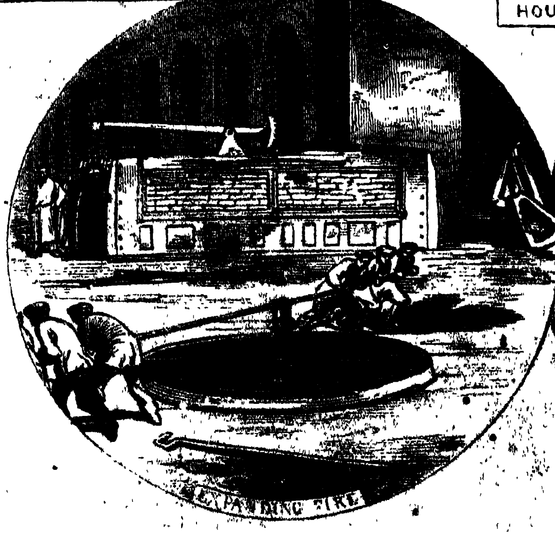
Thus have we traced, with needed brevity, the processes carried on in the great factory at Swindon. The locomotive, having all its parts made with perfect accuracy, "must be put together," according to Mr. Robert Stephenson, "as carefully as a watch," and when painted, varnished, and oiled, is fully prepared to start on its wonderful career. It is estimated that, besides ordinary preservation in working order, a passenger-engine will require new tubes and other heavy repairs, after running an average of about 95,000 miles, incurring an expenditure of about £100. It will thus be restored to a condition enabling it to work another distance of 95,000 miles; at the end of which it will need still heavier repairs. When these have taken place it will be ready to run a similar distance, at the termination of which repairs will be necessary to the amount of about £400; but after running 95,000 miles more, the engine will require re-erection, at a cost of about £1,000; always assuming that it has, meanwhile, been maintained in as perfect working condition as possible. The total of these periodical outlays is £2,480, and the mileage 380,000 miles, giving about three-halfpence per mile as the average deterioration of the machinery. The usual distance run annually by a locomotive is about 30,000 miles; which allows about three years and a quarter as the time at which the periodical repair becomes necessary.



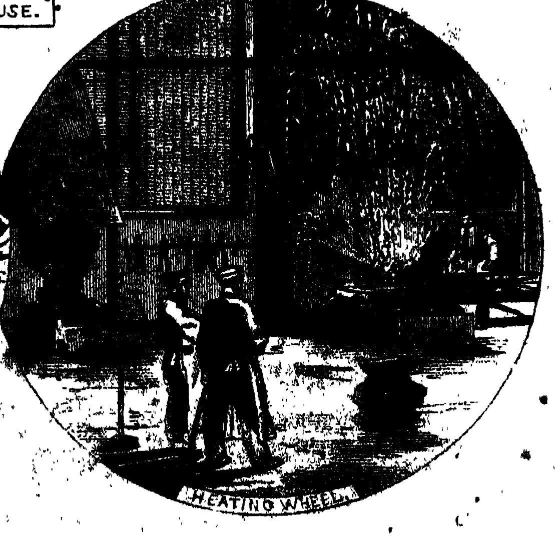
STEAM FORGING.



BOILER HOUSE.

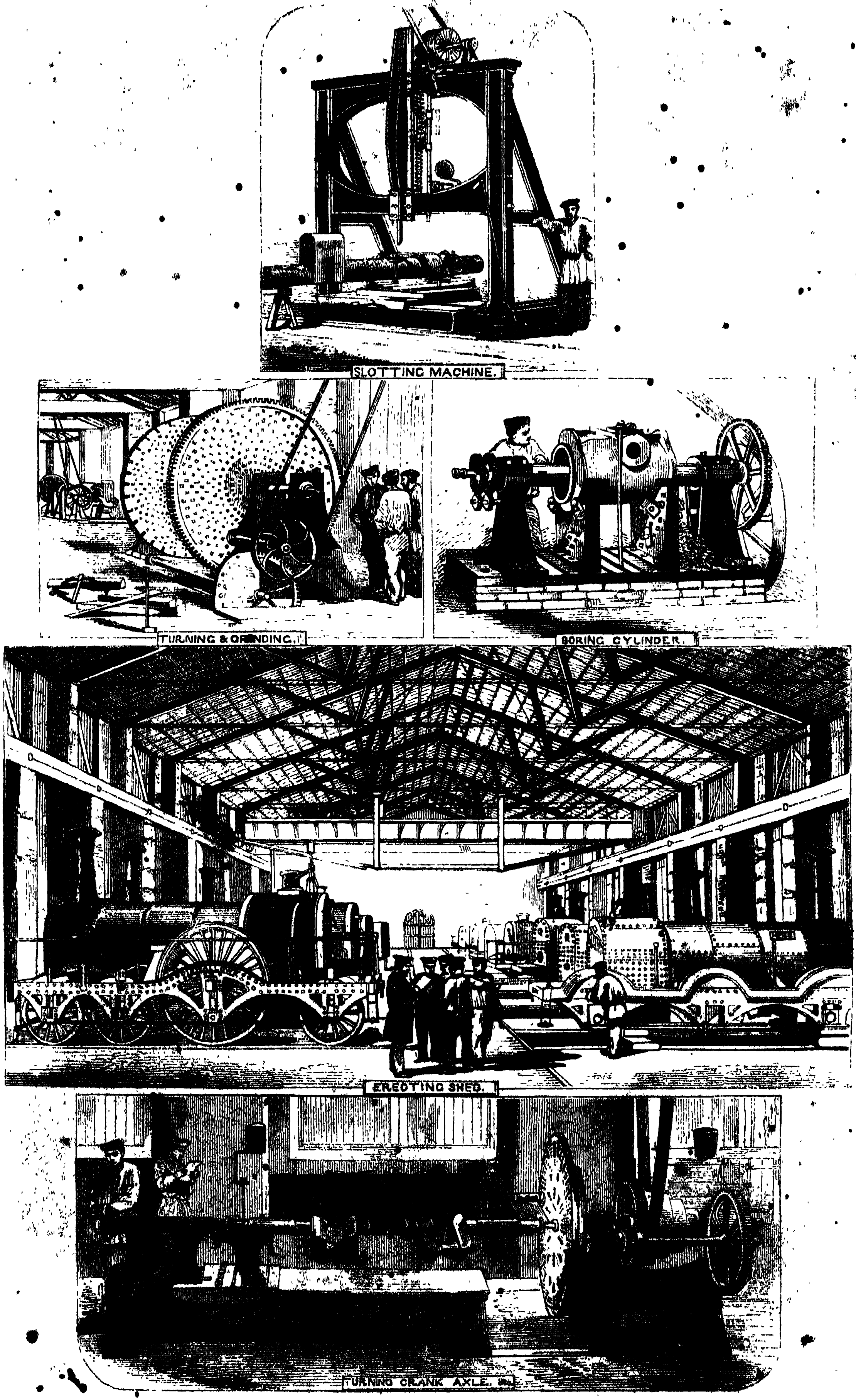


EXPANDING TIRE



HEATING WHEEL.

THE GREAT WESTERN RAILWAY COMPANY'S WORKS AT SWINDON.



SLOTTING MACHINE.

TURNING & GRINDING.

BORING CYLINDER.

ERECTING SHED.

TURNING CRANK AXLE, &c.

THE GREAT WESTERN RAILWAY COMPANY'S WORKS AT SWINDON.

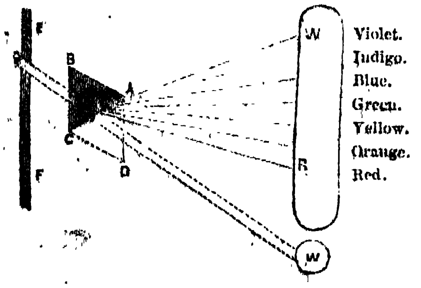
RECENT DISCOVERIES IN PHOTOGRAPHY.

One of the most interesting discoveries of the present day, is that of taking pictures, whether landscape or portrait, by means of light. The most suitable and expressive term for these is "sun-pictures;" and, although the Sun is not a member of the Royal Academy, and therefore cannot attach "R.A." to his name, yet nowhere can we find more faithful or truthful representations than those taken by this really great artist.

The terms Daguerreotype, Talbotype, Calotype, &c., have been applied to various kinds of sun-pictures. The word Photography is derived from two Greek words, *phos* (light) and *grapho* (I write). The term Daguerreotype owes its origin to M. Daguerre, the discoverer of the art of taking sun-pictures on silvered plates of metal. The words Talbotype and Calotype are applied to sun-pictures taken on paper, the discovery of which is due to Mr. Fox Talbot, whose researches are well known to have considerably advanced the photographic art. Other appellations have been employed to designate various kinds of photographic pictures by Mr. Hunt and Sir John Herschel, which, though extremely interesting, cannot here be more particularly enlarged upon. It is desirable that all these various terms should be discarded, and the simple designation of "sun-pictures" on paper, glass, &c., everywhere adopted.

In order to give our readers a correct idea of the mode in which sun-pictures are formed, we must first say a few words on the light, which, emanating from the sun, is the agent employed in their production. Sir Isaac Newton discovered, that when a ray of white or colourless light was made to pass through a glass prism, it was decomposed or divided into *seven* colours, termed by him primitive colours—viz., violet, indigo, blue, green, yellow, orange, and red, as indicated in the accompanying diagram. Sir David Brewster, following out the discovery of Newton, ascertained that, instead of seven, there exist in fact only *three* primitive colours, blue, yellow, and red, which, by combination with each other, produce the violet, indigo, orange, and green, as secondary colours.

Fig 1.

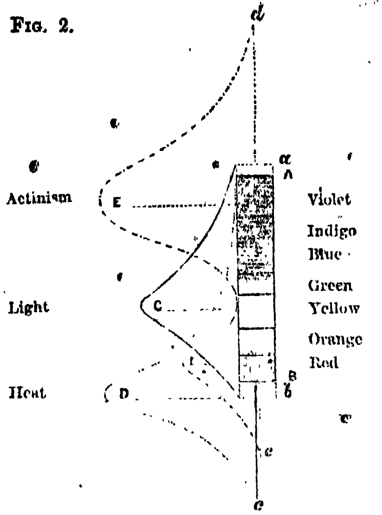


The above diagram shows also the refraction or bending of the ray of light in passing through the glass prism, which, but for the refracting power of the prism, would pass to the point marked W.

We now come to notice certain peculiarities existing in this *spectrum*, or decomposed ray of light, which must be here explained. Sir W. Herschel found, that a thermometer placed in different parts of the spectrum indicated variations of temperature, showing that the different colours possessed different heating powers, gradually increasing from violet, in which it was least, to red, the maximum point being just beyond the red colour. Previous to this, it was known that light produced a blackening influence on paper moistened with a colourless solution of nitrate or chloride of silver, and the discovery above referred to, led to the investigation, whether the chemical effect thus produced by light was due to heat or to some other cause. The result of these investigations, conducted chiefly by Mr. Hunt and Sir J. F. W. Herschel, led to the conclusion that the chemical effects of light are not due to the heat present in the rays, but that, on the contrary, the greatest amount of chemical action takes place at the violet end of the spectrum, where the heating power is least, diminishing in proportion to its approach to the red, where the heat is greatest.

Experiments have also shown, that the luminous or light-giving part of the ray is greatest in the yellow colour, diminishing towards either end of the spectrum. Light, therefore, may be said to be composed of three distinct fluids, producing heating, chemical, and luminous effects; the relation of which to each other is exemplified in the following diagram:—

Fig. 2.

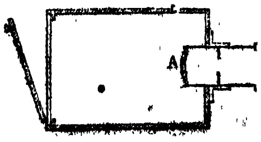


Various terms have been suggested as appropriate to distinguish that part of the light which produces all the chemical changes noticed in photographic experiments; that of *actinism* (from the Greek word *actin*, a ray), though open to some objections, is the one now generally adopted. The shaded portion of the above diagram represents the colours as they occur in the decomposed solar beam, and the curved lines indicate the relative amount of actinism, light, and heat, the former of which is greatest at E, light being most intense at C, and heat greatest at D.

Having thus described the nature of the light in reference to its action as a photographic agent, we now proceed to speak of the apparatus and means employed in obtaining sun-pictures. Most of our readers are no doubt acquainted with the common camera-obscura, or darkened chamber, in which light is admitted through a small hole in which a lens is fixed, the object being in the focus of the lens—that is to say, the rays of light from the object fall on the lens, and thence passing into the chamber or box are reflected by means of a mirror, showing the object delineated on a piece of ground glass, from whence it is copied by the artist. This apparatus is not suited for Photography.

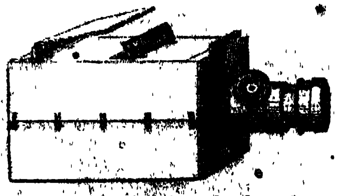
The simplest description of camera applicable to photographic purposes is a cigar-box, blackened inside, having a hole cut in the front part to admit a lens, and the hinder part of the box placed on hinges, so as to fall back to receive the paper, glass, or metal-plate, on which the object is to be delineated. The annexed engraving shows a camera of the simplest form, in which A is the lens.

Fig. 3.



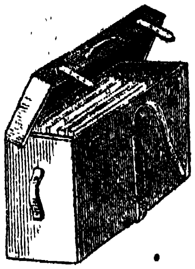
The most useful and complete camera for general photographic purposes, is that represented in the annexed engraving:—

Fig. 4.



The front of this camera, holding the lens, has a vertical adjustment, which enables the relative proportion of foreground or sky in the required picture to be altered without disturbing the position of the camera. It is adapted also for portraits as well as views. When not required for use, the lens is unscrewed, the front and sides lifted from their grooves, and the body of the camera folded together by the hinges shown in the engraving. By this arrrangement, the camera-box, together with the slides for prepared paper, glass, or silver plates, and all the other articles required, can be conveniently packed in the smallest possible space in the leather case shown in the accompanying engraving.

FIG. 5.



We will first describe the method of taking Daguerreotype views. For this purpose a copper plate, covered with a perfectly pure and polished surface of silver, is employed, entirely free from grease, or any oily substance. The surface of this silvered plate is first exposed to the vapour of iodine, by which means a coating of iodide of silver is produced—a preparation capable of being acted upon by the chemical or actinic portion of the solar light. For this purpose the plate D is introduced into an apparatus of the kind shown at Fig. 6, or a still better one as represented at Fig. 7, in which latter it is exposed both to the action of iodine and also that of a preparation of bromine, the use of which is found to accelerate the next operation.* When the plate has received the required coating of iodine, &c., as above mentioned, it is ready to be placed in the camera. Prior to the introduction of the plate, the focus of the lens of the camera is adjusted with the greatest care, until a perfectly clear and distinct representation of the object to be taken, is seen on a piece of ground glass placed in exactly the same position as the plate is to occupy. The focus being thus obtained, the ground glass is removed, and the iodized plate introduced into the camera. The result of this exposure of the plate in the camera, is a perfect delineation of the landscape or other object, which in the case of the ground glass, though appearing on its surface, was not fixed, but which, in the case of the prepared plate—although at this stage of the process not actually visible—is rendered so by the introduction of the plate into the mercury-box, here shown, in which B is the prepared plate, and C a small yellow glass window, over which slides a shutter D. By the heat of a spirit lamp, the mercury, placed in an iron cup, is volatilised, and the vapour coming into contact with the plate produces such an action, as leads to the development of the picture in the course of from five to twenty minutes. The plate is then dipped in a solution of hyposulphite of soda, for the purpose of removing the sensitive coating first applied, and then washed in distilled water. A solution of chloride of gold with hyposulphite of soda is then applied to the surface of the plate, for the purpose of fixing the picture, and thus rendering it less liable to be acted upon by external circumstances. At present we are unacquainted with any method of obtaining these pictures in the natural colours of the objects delineated, the lights and shades only being represented. They may, however, be coloured by hand, in the same way as a painting, and this, when skilfully performed, produces a very pleasing effect.

FIG. 6.

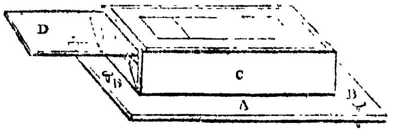


FIG. 7.

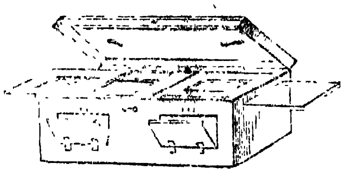
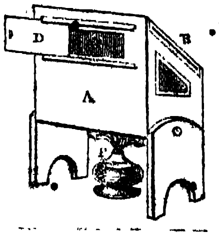


FIG. 8



In the case of the Calotype, or Talbotype, paper is employed, instead of the silver plate used in the Daguerreotype process. The paper is first prepared on one side with a solution of nitrate of silver, after which it is brought into contact with a solution of iodide of potassium, by which means a coating of iodide of silver is formed on the surface of the paper. It is then washed, to remove the nitrate of potash also formed, which, if not removed, would interfere with subsequent operations.

The iodized paper thus prepared is not in the least sensitive to light. In order to give it sensitiveness, a solution of gallo-nitrate of silver and acetic acid is applied to it, after which, while still damp, it is placed in the camera between two pieces of plate glass, where, by a few minutes' exposure, it receives the impression of the landscape or other object, as in the Daguerreotype process.

When the paper is removed from the camera, very little or no trace whatever of a picture is visible, until it has been subjected to the action of a solution of gallic acid and aceto-nitrate of silver, which is applied to the surface of the paper on which the latent image has been formed, the development of the picture being accelerated by the cautious application of heat. It is then washed, first in distilled water, and afterwards in a solution of hyposulphite of soda, for the purpose of removing the nitrate and iodide of silver, and so fixing the picture that it may undergo no further change when exposed to the light. It is lastly dried between folds of blotting-paper.

The picture thus obtained, is, however, a negative one—that is, the positions of the objects, together with all the lights and shades, are reversed with respect to their natural appearance. In order to obtain their positive or correct representation, the negative picture is laid perfectly flat and smooth on paper prepared with muriate of baryta and nitrate of silver, and the whole being placed in the reversing frame and exposed to the light, a positive or correct picture is produced.

We now come to speak of sun pictures on glass, the perfect transparency and evenness of which, renders it peculiarly fitted for photographic purposes. Many processes have been devised for rendering plates of glass thus available; we shall only describe the albumen and collodion processes, as these give the best results. The following is the collodion process:—The prepared collodion (solution of gun cotton in ether) is poured on a piece of flat glass, which is then immersed in a solution of nitrate of silver, after which it is introduced in its moist state into the camera. The picture thus taken is developed by subsequent immersion of the plate in a solution of pyrogallic acid with acetic acid; after which the plate is washed, and then covered with a saturated solution of hyposulphite of soda, which serves to fix the picture. These pictures are more or less negative; but the most beautiful and decided positives may be obtained by adding a small quantity of nitric acid to the pyrogallic solution. Purple pictures may also be obtained by using acetate of lead, and green pictures by the employment of acetate of lime and ordinary gallic acid. The pictures thus obtained may be treated as negative pictures, from which positive may be obtained in the usual way.

Albumen process.—This process is, at the present time, the object of much practical research on the part of photographers, and it was the improvements recently described by Mr. Fox Talbot in this process, which suggested to us the idea of giving this outline of the art of Photography. Mr. Talbot has succeeded in rendering the plate of glass so sensitive, as to be capable of receiving the impression or picture of printed characters placed on a rapidly-revolving wheel, the light employed being that of an electrical battery. Mr. Talbot's method of imparting this great degree of sensitiveness to the glass plate is as follows:—The liquid portion of the white of an egg (albumen) is mixed with an equal quantity of water, and spread very evenly upon a glass plate, which is then dried at the fire. The plate thus coated with albumen is next dipped into an aqueous solution of nitrate of silver, to which a large quantity of alcohol has been added, one ounce of the mixture containing three grains of the nitrate. The plate is then dried, washed with distilled water to remove any superfluous portions of nitrate of silver, and again coated with albumen, in drying which care must be taken that too much heat is not employed. A mixture is next prepared of a solution of protoiodide of iron, an equal volume of acetic acid, and ten volumes of alcohol. After this mixture has stood for two or three days, the plate is dipped into it for a few seconds, after

(*Continued on page* 110.)

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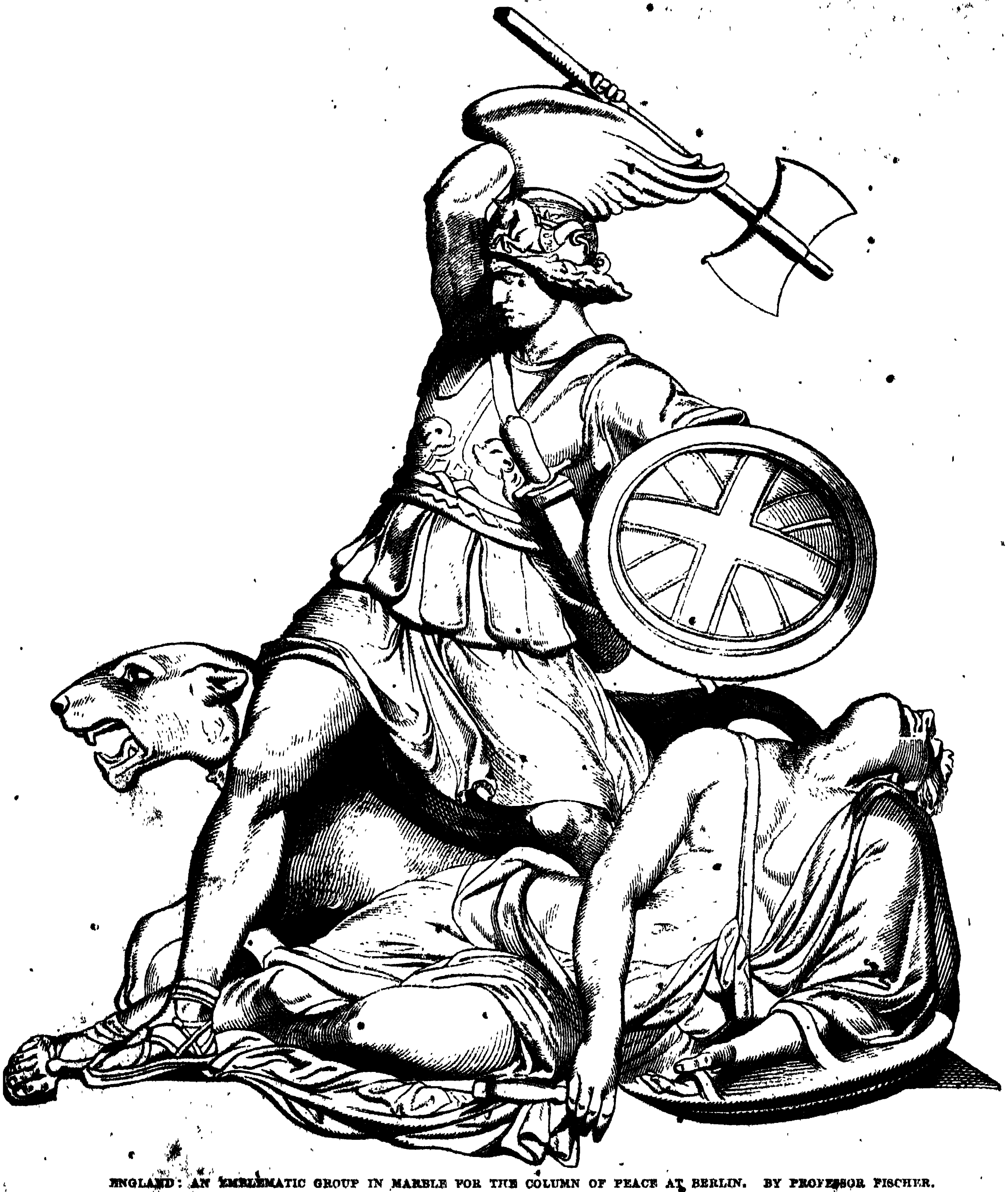
* An Exhibition prize medal was awarded for this bromo-iodine box, to Messrs. Horne, Thornthwaite, and Wood, the general excellence of whose photographical apparatus is indisputable.

MODERN SCULPTURE.—MARBLE GROUPS FOR THE COLUMN OF PEACE AT BERLIN.



ENGLAND: AN EMBLEMATIC GROUP IN MARBLE FOR THE COLUMN OF PEACE AT BERLIN. BY PROFESSOR FISCHER.

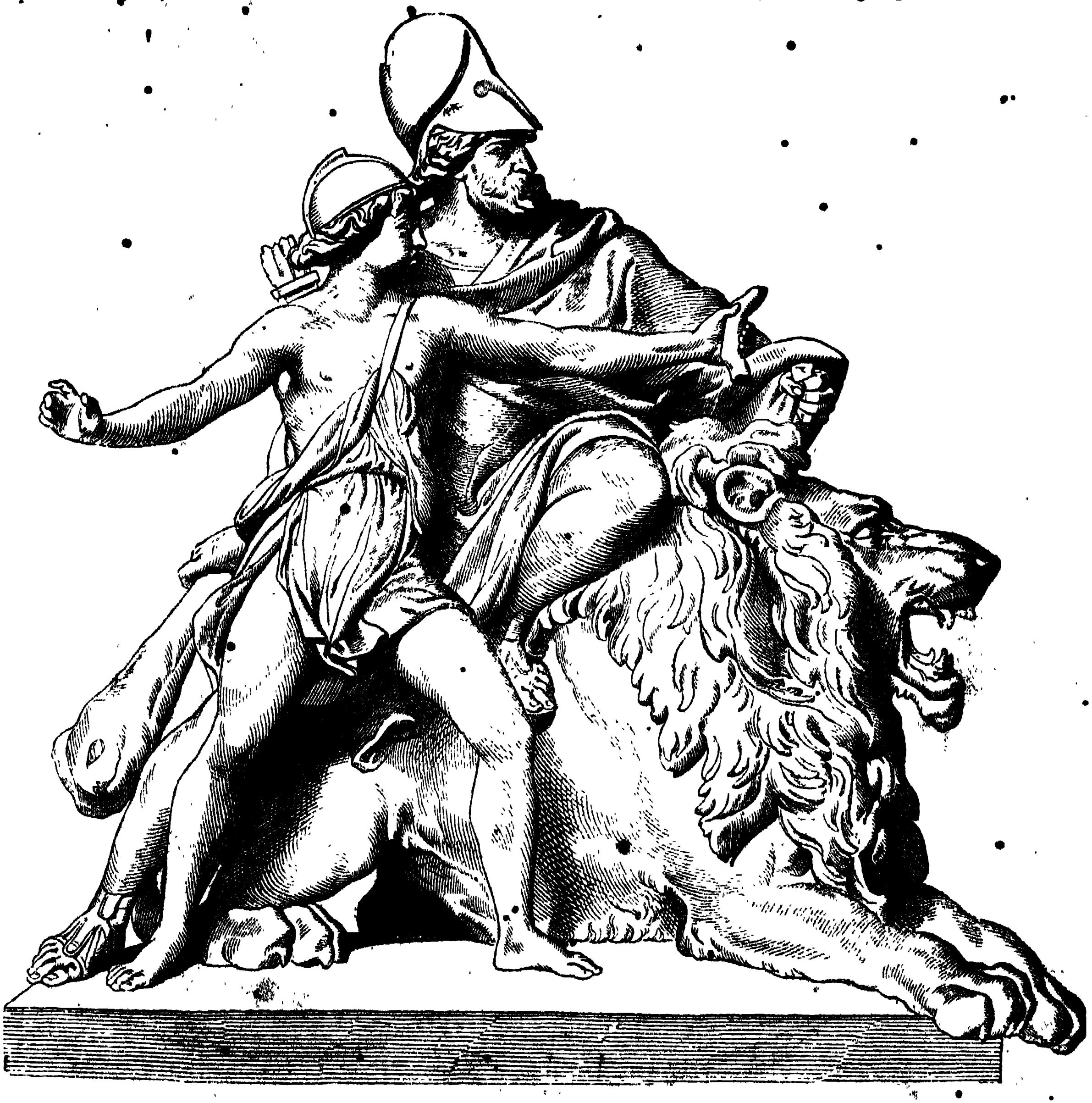
The Column of Peace was finished in the year 1843, in the square known as the "Belle Alliance," in Berlin, and inaugurated on the 3rd of August, the birthday of the late King Frederick William III., who had laid the first stone of this national monument.

This monument, erected by the venerable monarch as a peace-offering to generations yet to come, was the deep, truthful expressions of a heart still influenced by long years of past contest. Well was he surnamed by his subjects "The Just," for perhaps no monarch more entirely deserved so distinguished a title.

The execution of this monument proves how completely the son has appreciated the comprehensive idea of his father. Although the Column of Peace is of itself of artistic and national importance, yet the well-known taste for art which Frederick William IV. has so often strikingly exhibited, suggested to him that this noble work was still unfinished.

To render the symbol complete, it was necessary to embody, in this monument, a representation of that united power which gained for the trembling German people a sweet peace after a deadly struggle; and that decisive moment was therefore chosen in which the lowering thunder-clouds were scattered with an indomitable courage, and the peaceful sunbeams were again visible—the battle of Waterloo.

Professor Fischer, a sculptor, whose "Shield for the Prince of Wales," and "Statue of Moses," at Berlin, had already crowned him with celebrity, was amongst those who sent in designs for the national monument. His ideas at once met with the King's approval, and he was commissioned to put them into execution forthwith. It was determined that the lofty Column of Peace should be decorated by four gigantic groups in marble—one at each corner, on a separate pedestal—each to represent one of the nations engaged in the great struggle against the French Emperor. We present our readers with engravings of two of these emblematic groups, now almost completed. The one represents England, the other Belgium, and Nassau, and the Netherlands. The remaining two are, at present, still in models, and will symbolise Prussia and Brunswick. England, in the full panoply of a Roman warrior, but with the battle-axe of the old Saxons, stands with uplifted arm, and in an attitude of fierce determination, over the body of his fallen comrade, while the leopard at his side growls fiercely upon the approaching foe. It is a fine conception, and admirably worked out. Belgium and Nassau are represented by an old warrior sitting on an enraged lion, and watching with interest the flight of the arrow which the ardent youth at his side has just discharged from his bow. The eager impetuosity of the boy soldier, the steady calmness of the veteran, and the fierceness of the monarch of the forest, are embodied with wonderful truthfulness.



BELGIUM AND NASSAU: A GROUP IN MARBLE INTENDED TO DECORATE THE COLUMN OF PEACE AT BERLIN. BY PROFESSOR FISCHER.

Until the completion of the column, it will be impossible to realise the full sublimity of the idea to which it owes its origin. From the cold lips of these groups of "breathing marble" the spectator may learn as grand a story of suffering, heroism, and fortitude, as any to be found in the pages of history. The four nations which they symbolise were brothers in arms through bloody war of twenty years duration. On field and flood, throughout every corner of Europe, they flung away life and treasure to prevent their being absorbed in the great centralisation of Napoleon. The co-mingled dust of their patriot dead has mouldered now for many a year in the fertile corn-fields of Waterloo and their descendants can pay no worthier tribute to their valour and devotion than by consecrating one of the noblest triumphs o modern art to the memory of the cause for which they fought.

It was the intention of Professor Fischer to have shown small clay models of these spirited marbles at the late Exhibition; and it is to be regretted that circumstances occurred which prevented his putting it into execution.

The artist who has transferred these groups to wood has caught the air, attitudes, and expressions of the figures with amazing fidelity.

PHOTOGRAPHY.—*Concluded from page* 107.

which it is rapidly dipped once or twice in a solution of nitrate of silver, containing seventy grains to one ounce of water, two parts of acetic acid being added to each three of the solution. The plate has now acquired a very high degree of sensibility. It is now placed in the camera in the usual manner, and in order to bring out the picture obtained, the plate is next dipped into a solution of protosulphate of iron, containing one part of a saturated solution diluted with two or three parts of water. The image appears very readily. After having been washed with water, the plate is placed in a solution of hyposulphite of soda, which in about one minute causes the picture to brighten up exceedingly by removing a kind of veil which previously covered it; after which the plate is washed with distilled water, and the process is terminated. A coating of albumen or varnish is a useful addition to preserve the picture from accident.

With the use of such a sensitive preparation as that above described, it is in our power to obtain pictures of all moving objects, no matter how rapid their motion, provided we have the means of sufficiently illuminating them with a sudden electric flash.

The question may be asked—of what use is Photography? To this we reply, in the language of the author of the "Poetry of Science":—"By means of Photography we are enabled to preserve the lineaments of those who have benefited their race by their genius or their bravery. By the agency of those very rays which give life and brilliancy to the laughing eye and roseate cheek, we can at once correctly trace the outline of the features we admire, and fill in those shadowy details which give the picture the charm of *vraisemblance*. The admirer of nature may copy her arrangements with strict fidelity. Every undulation of the landscape, every projecting rock or beetling tor, each sinuous river, and the spreading plains over which are scattered the homes of honest industry and peace, intermingled with the humble temples in which simple-hearted piety delights to kneel—these, all of these, may, by the sunbeam which illuminates the whole, be faithfully pencilled upon our chemical preparations."

The recent improvements patented by Mr. Talbot will prove of great use to the scientific traveller, inasmuch as he will be now enabled to take with him a supply of glass plates, partly prepared at home, and by means of a simple addition of a glass cell to the hinder part of the camera, and the assistance of a few bottles of chemical solutions, and a small curtain, take any number of landscapes, which at the close of the day, or the day following, he may finish at his leisure, thus rendering him independent of a darkened room in which to take his sun-drawn pictures.

Of these and various other practically useful and interesting applications of Photography we shall say more on a future occasion.

THE LADIES' DEPARTMENT.

BERTHA, IN MUSLIN APPLIQUE.

MATERIALS.—Widow's lawn and Brussels' net, sufficient of each to cut out a bertha, with ample margin; embroidery cotton, No. 60; Mecklenburgh, No. 120; sewing cottons, Nos. 50, 90, and 150; and pearl edging.

In our enumeration of the various kinds of embroidery, we specified "muslin appliqué" as one of those most in vogue at present. In the Swiss department of the Great Exhibition some very beautiful specimens were seen, in polkas, mantles, and other articles of attire. These are, however, of so elaborate a character, and so tedious to work, that we have preferred giving, as a first sample of this sort of embroidery, something more easily executed and more generally useful.

A section of the design being given of the full size, the whole pattern must be drawn from it. The sprays gradually increase in size to the centre of the back, where the pattern corresponds with that at the lower part of the corner. As the dimensions of the bertha must necessarily depend on the figure of the wearer, a paper pattern should be cut to fit, and from this the size is to be taken. The design must then be drawn on white paper, over which the muslin being laid, the pattern may be traced out with a very fine camel's-hair brush dipped in a solution of indigo, or stone blue and thin gum-water. The Brussels net is then tacked underneath the muslin, first all round the edges, and then over the surface of the bertha, wherever the threads will not interfere with the work. The tracing is next to be done, with embroidery cotton No. 60. This is merely running the whole of the pattern over the blue lines. No fastening on or off is required, the thread being merely cut off closely at the end of every spray or scroll. In tracing avoid going over the same place twice, as that part would necessarily be thicker. Those places which are filled in with point-lace stitches may, however, be run twice round. As the muslin and net being both cut away, it is necessary to work them in button-hole stitch for the sake of strength. Tracing should be done in very short stitches, care being taken that the needle should pass under a bar of net at every stitch. A good worker will trace every part a second time with the cotton with which she sews over the outlines. Here the stitches should be *long*, only passing through the work at points and curves, as the object is to give a firmer appearance to the sewing. Some people merely hold in a thread as they sew; but the mode of proceeding we have advised is by far the simplest. Every part is then sewed over the stitches, being close and very regular. The only parts not sewed are those where the muslin and net are both cut out. These are edged with close button-hole stitch. The thread must be fastened-off at the back of the work at the end of every needleful, the new thread being run a stitch or two along the line. Beyond the outer-line of sewing, a row of button-hole stitch must be worked, as an edge, entirely round the bertha. The pearl edging is subsequently added to this. To avoid contracting, or *puckering* the work, always hold it so that the muslin is straight on the finger. If held bias, it is certain to be puckered.

When every part is sewed over, the muslin is cut away from the net in those parts which form the *ground*, a pair of lace scissors being used for this purpose. Then, in the round, open spaces, single or double mechlin-wheels are worked (according to the size of the vacancy). The other openings are filled with English lace. The large spaces of plain net within the scrolls, and *not* forming the ground, may be ornamented with any fancy stitches which the taste of the worker may suggest. The specimen we have given is very simple and effective. A row of vandykes is made thus:—Darn backwards and forwards, so as to fill up three holes of lace; in the next line of holes, fill two, in the next, one, repeat up the line: make another row, of which the points shall meet these points, leaving a diamond of nine holes in every space. Do a single spot in the centre of each diamond. Repeat this pattern, leaving one or more lines of net between. The darning is done by taking up one thread and missing the next. The thread to be used for this purpose is extremely fine; it has, indeed, been manufactured expressly for this and similar delicate parts of lace-work.

Muslin appliqué may be transferred to new net, when the old is worn out, with very little trouble. The sprigs may then be differently arranged, according to the fashion.

TOILET SACHET.

MATERIALS.—Three-quarters of a pound of knitting cotton, No. 16; and tapered indented crochet-hook, No. 20. A yard of pink or blue ingrain gingham.

This article, made in the form of an envelope, is intended to hold the night-dress and cap, and lies on the pillow during the day, forming an elegant appendage to the drapery. The lining should, of course, be of a tint to suit the rest of the furniture, and may be of silk, if preferred; but, as gingham will wash with the cotton, it is less troublesome. The sachet is worked in crochet, the edging in knitting, for which the receipt will afterwards be given.

Make a chain of 285 stitches, with three more, which you will twist; miss these three, and work in d.c. along the row. Break off at the end.

2nd row: D.c., working on the third of the three chain at the beginning of the row, as if it were a d.c. stitch.

Observe, that as there are bits of thread left at the ends of each row, they should be worked in at the next, which may easily be done, as there are two close squares at the beginning and end of every row.

3rd row: 2 close squares; then open squares till you come to within 7 d.c. of the end. Finish with 2 close squares.

4th row: (*b*) 2 close, 19 open, 4 close, 20 open, (*a*) 5 close.

5th row: (*b*) 2 close, 14 open, 2 close, 2 open, 6 close, 17 open, (*a*) 9 close.

6th row: (*b*) 2 close, 13 open, 4 close, 1 open, 6 close, 15 open, (*a*) 13 close.

7th row: (*b*) 2 close, 8 open, 2 close, 2 open, 14 close, 12 open, 5 close, (*a*) 5 open.

8th row: (*b*) 2 close, 7 open, 4 close, 2 open, 15 close, 10 open, 5 close, (*a*) 7 open.

9th row: (*b*) 2 close, 3 open, 3 close, 1 open, 16 close, 8 open, 6 close, 2 open, (*a*) 3 close.

10th row: (*b*) 2 close, 2 open, 2 close, 3 open, 10 close, 6 open, 5 close, 7 open, 7 close, 1 open, (*a*) 5 close.

11th row: (*b*) 2 close, 1 open, 6 close, 1 open, [illegible] close, 1 open

6 close, 1 open, 4 close, 7 open, 7 close, 1 open, 2 close, (*a*) 1 open.

12th row: (*b*) 2 close, 4 open, 4 close, 1 open, 6 close, 1 open, 8 close, 1 open, 3 close, 6 open, 8 close, 1 open, 2 close, (*a*) 1 open.

13th row: (*b*) 2 close, 5 open, 4 close, 1 open, 4 close, 1 open, 3 close, 4 open, 5 close, 3 open, 1 close, 2 open, 8 close, 1 open 2 close, (*a*) 3 open.

14th row: (*b*) 2 close, 6 open, 4 close, 1 open, 2 close, 1 open, 3 close, 6 open, 3 close, 4 open, 5 close, 1 open, 5 close, 1 open, 2 close, (*a*) 3 open.

15th row: (*b*) 2 close, 5 open, 5 close, × 1 open, 2 close, × twice, 14 open, * 5 close, 1 open, * twice, 2 close, (*a*) 3 open.

16th row: (*b*) 2 close, 4 open, 7 close, 1 open, 1 close, 1 open, 2 close, 15 open, 3 close, 2 open, 4 close, 1 open, 2 close, (*a*) 5 open.

17th row: (*b*) 2 close, 6 open, 5 close, 1 open, 1 close, 1 open, 2 close, 20 open, 4 close, 1 open, 2 close, (*a*) 5 open.

18th row: (*b*) 2 close, 7 open, 4 close, 1 open, 1 close, 1 open, 2 close, 19 open, 4 close, 1 open, 2 close, (*a*) 7 open.

19th row: (*b*) 2 close, 8 open, 4 close, 2 open, 2 close, 11 open, 3 close, 5 open, 4 close, 1 open, 2 close, (*a*) 7 open.

20th row: (*b*) 2 close, 8 open, 4 close, 2 open, 2 close, 9 open, 4 close, 5 open, 4 close, 1 open, 2 close, (*a*) 9 open.

21st row: (*b*) 2 close, 9 open, 4 close, 1 open, 3 close, 7 open, 4 close, 5 open, 4 close, 1 open, 3 close, (*a*) 4 open, 3 close, 2 open.

22nd row: (*b*) 2 close, 10 open, 3 close, 1 open, 4 close, 5 open, 6 close, 3 open, 4 close, 1 open, 3 close, (*a*) 3 open, 3 close, 1 open, 2 close, 2 open.

23rd row: (*b*) 2 close, 11 open, 3 close, 1 open, 4 close, 5 open, 11 close, 1 open, 3 close, 3 open, 1 close, 1 open, 1 close, (*a*) 1 open.

24th row: (*b*) 2 close, 6 open, 8 close, 2 open, 18 close, 1 open, 4 close, 3 open, 1 close, 1 open, 1 close, (*a*) 1 open.

25th row: (*b*) 2 close, 5 open, 11 close, 2 open, 14 close, 2 open, 1 close, 3 open, 2 close, 1 open, 1 close, (*a*) 1 open.

26th row: (*b*) 2 close, 4 open, 13 close, 2 open, 11 close, 3 open, 5 close, 3 open, 4 close, (*a*) 1 open.

27th row: (*b*) 2 close, 3 open, 4 close, 7 open, 4 close, 3 open, 7 close, 4 open, 5 close, 3 open, (*a*) × 2 close, 1 open, × 3 times, 2 close.

28th row: (*b*) 2 close, 2 open, 4 close, 22 open, 2 close, 1 open, 5 close, 4 open, 2 close, 1 open, 1 close, (*a*) 3 open.

29th row: (*b*) 2 close, 1 open, 4 close, 1 open, 15 close, 2 open, 5 close, 3 open, 4 close, 4 open, 2 close, 1 open, 2 close, (*a*) 3 open.

30th row: (*b*) 2 close, 1 open, 3 close, 1 open, 15 close, 2 open, 4 close, 2 open, 6 close, 5 open, 2 close, 1 open, (*a*) 3 close, 2 open, 2 close.

31st row: (*b*) 2 close, × 1 open, 3 close × twice, 5 open, 5 close, 2 open, 5 close, 1 open, 7 close, 5 open, 2 close, 1 open, 2 close, 2 open, (*a*) 1 close.

32nd row: (*b*) 2 close, × 1 open, 2 close, × twice, 5 open, 5 close, 2 open, 6 close, 1 open, 7 close, 5 open, 3 close, 1 open, 2 close, 2 open (*a*) 1 close.

33rd row: (*b*) 2 close, 2 open, 4 close, 4 open, 6 close, 2 open, 5 close, 1 open, 7 close, 5 open, 3 close, 1 open, 2 close, 3 open, (*a*) 1 close.

34th row: (*b*) 2 close, 2 open, 2 close, 3 open, 6 close, 3 open, 5 close, 1 open, 8 close, 4 open, 3 close, 1 open, 3 close, (*a*) 4 open, 1 close, 2 open.

35th row: (*b*) 2 close, 3 open, 1 close, 3 open, 5 close, 4 open, × 5 close, 1 open × twice, 2 close, 4 open, 3 close, 1 open, 3 close (*a*) 5 open, 1 close, 3 open.

36th row. (*b*) 2 close, 6 open, 5 close, 1 open, 2 close, 2 open, 4 close, 2 open, 4 close, 3 open, 1 close, 2 open, 4 close, 1 open, 4 close, (*a*) 5 open, 1 close, 3 open.

37th row: (*b*) 2 close, 5 open, 4 close, 2 open, 3 close, × 1 open, 5 close, × twice, 5 open, 4 close, 1 open, 4 close, 3 open, (*a*) 3 close, 1 open, 1 close.

38th row: (*b*) 2 close, 4 open, 4 close, 1 open, 4 close, 1 open, 6 close, 1 open, 4 close, 5 open, 3 close, 2 open, 4 close, (*a*) 2 open, 8 close, 3 open.

39th row: (*b*) 2 c., 4 o., 3 c., 1 o., 5 c., 1 o., 3 o. × 1 o., 2 c., × twice, 1 o., 1 c., 4 o., 3 c., 1 o., 6 c., (*a*) 1 o., 2 c., 2 o., 2 c., 1 o., 3 c., 2 o.

40th row: (*b*) 2 c., 3 o., 4 c., 1 o., 5 o., 1 o., 2 c., 2 o., 5 c., 5 o., 3 c., 1 o., 6 c., (*a*) 1 o., 2 c., 1 o., 4 c., 1 o., 1 c., 1 o., 2 o., 2 o.

41st row: (*b*) 2 c., 3 o., 3 c., 1 o., 3 c., 1 o., 2 c., 2 o., 5 c., 5 o., 2 c., 1 o., 6 c., (*a*) 1 o., 2 c., 1 o., 7 o., 1 c., 2 c., 3 o.

42nd row: (*b*) 2 c., 2 o., 3 c., 1 o., 6 c., 1 o., 3 o., 3 c., 3 c., 5 o., 2 c., 1 o., 6 c., (*a*) 2 o., 2 c., 1 c., 4 c., 1 o., 2 c., 1 o., 3 c., 3 o.

43rd row: (*b*), 2 c., 2 o., 2 c., 1 o., 7 c., 1 o., 3 c., 4 o., 3 c., 1 o., 2 c., 1 o., 4 c., 3 o., (*a*) 2 c., 1 o., 5 c., 1 o., 2 c., 1 o., 2 c., 5 c.

44th row: (*b*) 2 c., 2 o., 4 c., 1 c., 5 c., 1 o., 3 o., 11 c., 4 o., (*a*) 6 o., 2 c., 1 o., 4 c., 2 o., × 1 c., 1 o., × twice, 1 c., 3 c.

45th row: (*b*) 2 c., 2 o., 3 o., 2 c., 4 c., 1 o., 5 c., 10 c., 2 c., 2 o., c., (*a*) 3 o., 2 c., 1 o., 4 c., × 1 c., 1 c., × 3 times, 1 c., 2 c., 6 o.

46th row: (*b*) × 2 c., 2 o., × twice, 4 c., 2 o., 6 c., 9 o., 1 c., 2 o., 2 c., (*a*) 4 o., 2 c., 1 o., 3 c., * 1 o., 3 c., * twice, 2 o., 2 c., 7 o.

47th row: (*b*) 2 c., 3 o., 1 c., 2 o., 3 c., 1 o., 1 o., 1 o., 7 c., 9 o., 4 c., (*a*) 4 o., 2 c., 1 o., 3 c., × 1 c., 2 c., × twice, 1 o., 3 o., 7 o.

48th row: (*b*) 2 c., 5 o., 8 c., 1 o., × 2 c., 1 o., × twice, 3 c., 9 o., 4 c., (*a*) 6 o., 1 c., 1 o., 8 o., 1 o., 2 c., 1 o., 1 c., 2 o., 2 c., 9 o.

49th row: (*b*) 2 c., 4 o., × 3 c., 1 o., × twice, 2 c., 18 o., 4 c., (*a*) 7 o., 1 c., 1 o., 6 c., 2 o., 3 c., 9 o.

50th row: (*b*) 2 c., 4 o., 2 c., 1 o., 4 c., 1 o., 2 c., 7 o., 1 c., 5 o., 3 c., (*a*) 8 o., 2 c., 1 o., 3 c., 2 o., 1 c., 1 o., 2 o., 11 o.

51st row; (*b*) 2 c., 4 o., 4 c., 1 o., 2 c., 1 o., 3 c., 5 o., 2 c. 6 o., 3 c., (*a*) 8 o., 2 c., 3 o., 3 c., 1 o., 1 c., 11 o.

52nd row: (*b*) 2 c., 5 o., × 2 c., 2 o., × twice, 3 c., 3 o., 3 c., (*a*) 19 o., 3 c., 1 o., 1 c., 23 o.

53rd row: (*b*) 2 c., 6 o., 1 c., 2 o., 3 c., 2 o., 7 c., (*a*) 49 o.

54th row: (*b*) 2 c., 10 o., 3 c., 4 o., 4 c., (*a*) 49 o.

55th row: (*b*) 2 c., 11 o., 9 c., (*a*) 51 o.

56th row: (*b*) 2 c., 12 o., 7 c., (*a*) 53 o.

57th row: 2 c., 13 o., 4 c., 57 o., 4 c., 13 o., 2 c.

58th to 78th row inclusive: 2 close squares at each end, and the intermediate all open squares. Finish with two rows of double crochet. Two of these pieces are required.

For the Pointed Piece.—As the narrow edging with which this is trimmed is added at the sides, the piece itself is not so wide as that already given. Make a chain of 268 stitches, and work one row in d.c.

The second is also worked in d.c., but diminished two squares at each end, thus: begin on the *second* d.c. stitch, slip 2, s.c. 2, d.c. till you come to within five of the end, then s.c. 2, slip 2.

Decrease the next and all succeeding rows one square at each end, by working on the first four d.c. stitches of the row 1 slip, 2 s.c., 1 d.c., after which three more d.c., the other end being made to correspond.

The row succeeding the two of d.c. is entirely in open square crochet, except those 7 stitches at the ends.

4th row: (*b*) 1 slip, 2 s.c., 4 d.c., 31 open squares, 3 close, 4 open, (*a*) 3 close. (Observe that in this and all the following rows, the first open square comes over the second of the preceding line. The first and last 7 stitches are not mentioned, as they occur in every row.)

5th row: (*b*) 28 o., 2 c., 3 o., 1 c., 2 o., 1 c., (*a*) 3 c.

6th row: (*b*) 24 o., 3 c., 6 o., 1 c., 1 o., 1 c., (*a*) 3 o.

7th row: (*b*) 23 o., 1 c., 9 o., 1 c., 1 o., (*a*) 3 c.

8th row: 21 o., 1 c., 27 o., 1 c., 21 o.

9th row: Here the initial begins. I have chosen an M as being a common letter; any other may be substituted; care being taken to place it in the exact centre of the space indicated between the brackets. 19 o., 1 c. (7 o., 1 c., 2 o., 2 c., 3 o., 3 c., 11 o.), 1 c., 19 o.

10th row. 12 o., 3 c., 3 o., 1 c. (8 o., 3 c., 1 o., 1 c., 1 o., 2 c., 2 o., 1 c., 10 o.), 1 c., 3 o., 3 c., 12 o.

11th row: 10 o., 1 c., 3 o., 1 c., 1 o., 1 c. (10 o., 1 c., × 3 o., 2 c., × twice, 10 o.), 1 c., 1 o., 1 c., 3 o., 1 c., 10 o.

12th row: 9 o., × 1 close, 2 o., × twice, 1 c., 10 o., 2 c., 2 o. 2 c., 1 o., 1 c., 1 o., 3 c., 9 o.), 1 c., * 2 o., 1 c., * twice, 9 o.

13th row: 9 o., 1 c., 3 o., 1 c. (11 o., 2 c., 2 o., 3 c., 2 o., 2 c., 11 o.), 1 c., 3 o., 1 c., 9 o.

14th row: 9 o., 3 c., (12 o., × 2 c., 2 o., × twice, 3 c., 12 o.), 3 c., 9 o.

15th row: 8 o., 3 c. (12 o., 2 c., 1 o., 3 c., 2 o., 2 c., 1 o., 1 c., 11 o.) 3 c., 8 o.

16th row: 6 o., 1 c., 3 o., 1 c. (11 o., × 2 c., 2 o., × twice, 2 c., 12 o.), 1 c., 3 o., 1 c., 6 o.

17th row: 4 o., × 1 c., 2 o., × twice, 1 o. (10 o., 2 c., 2 o., 2 c., 3 o., 1 c., 11 o.) * 1 close, 2 o., * twice, 1 c., 4 o.

18th row: × 3 o., 1 c., × twice, 1 o., 1 c. (7 o., 1 c., × 2 o., 2 c., × twice, 1 o., 1 c., 2 o., 1 c., 10 o.), 1 c., 1 o., × 1 c., 1 o., × twice.

19th row: 3 o., 3 c., 3 o., 1 c. (7 o., 4 c., 2 o., 2 c., 2 o., 1 c., 2 o., 3 c., 6 o.), 1 c., 3 o., 3 c., 3 o.

20th row: 8 o., 1 c. (8 o., 2 c., 2 o., 2 c., 4 o., 3 c., 2 o., 1 c., 5 o.), 1 c. 8 o. This is the last row of the letter.

21st row: 8 o., 1 c., 27 o., 1 c., 8 o.

22nd row: (*b*) 8 o., 1 c., 9 o., 1 c., 1 o., (*a*) 3 c.

23rd row: (*b*) 7 o., 3 c., 6 o., 1 c., 1 o., 1 c., (*a*) 3 o.

24th row: (*b*) 9 o., 2 o., 3 o., 1 c., 2 o., 1 c., (*a*) 3 o.

25th row: (*b*) 10 o., 3 c., 4 o., (*a*) 3 c.

26th row: Open square crochet, except the ends.

27th: All d.c.

It will be remembered that when the letters *b. a.* occur, the stitches between are to be repeated *backwards*, those following the *a* being the centre of the line, whether few or many.

The knitted edgings for trimming this Sachet are given separately; the narrow one trims the point, which is then sewed to the top of one of the squares; the two squares are then sewed together at the bottom and sides, and the broad lace goes all round. The whole is lined with silk or gingham.

KNITTED LACE.

(For trimming the Toilet Sachet.)

Materials.—Knitting cotton, No. 20; knitting needles, No. 18. Cast on twelve stitches, and knit one plain row.

1st pattern row: Knit 2, × make 1, knit 2 together, × twice, knit 2, make 2, knit 2 together, make 2, knit 2.

2nd: K. 3, p. 1, k. 2, p. 1, k. 2, p. 6.

3rd: K. 2, × m. 1, k. 2 t. × twice, k. 9.

4th: K. 3, m. 2, k. 2 t., k. 1, k. 2 t., m. 2, k. 2 t., p. 6.

5th: K. 2, × m. 1, k. 2 t., × twice, k. 2, p. 1, k. 4, p. 1, k. 2.

6th: K. 5, m. 1, k. 2 t., k. 3, p. 6.

7th: K. 2, × m. 1, k 2 t., × twice, k. 2 t., m. 2, k. 2 t., k. 1, k. 2 t., m. 2, k. 2 t., k. 1.

8th: K. 3, p. 1, k. 4, p. 1, k. 1, p. 6.

9th: K. 2, × m. 1, k. 2 t., × twice, k. 10.

10th: K. 1, k. 2 t., m. 2, k. 4 t., m. 2, k. 3, p. 6.

11th: K. 2, × m. 1, k. 2 t., × twice, k. 4, p. 1, k. 2, p. 1, k. 2.

12th: Cast off 3, k. 2, k. 2 t., k. 2, p. 6.

Repeat these twelve rows as often as may be required.

The contractions used in this receipt are —k., [illegible] p., [illegible] k. 2 t., or knit two together.

NARROW EDGING.

(For the Point of the Sachet.)

Materials.—The same needles and cotton. Cast on seven stitches.

1st row: Knit 3, make 2, knit 2 together, make 2, knit 2.

2nd: K. 3, p. 1, k. 2. p. 1, k. 3.

3rd: Plain knitting.

4th: K. 2, m. 2, k. 2 t., k. 1, k. 2 t., m. 2, k. 2 t., k. 1.

5th: K. 3, p. 1, k. 4, p. 1, k. 2.

6th: K. 5, m. 1, k. 2 t, k. 4.

7th: K. 1, k. 2 t., m. 2, k. 2 t., k. 1, k. 2 t., m. 2, k. 2 t., k. 1.

8th: K. 3, p. 1, k. 4, p. 1, k. 2.

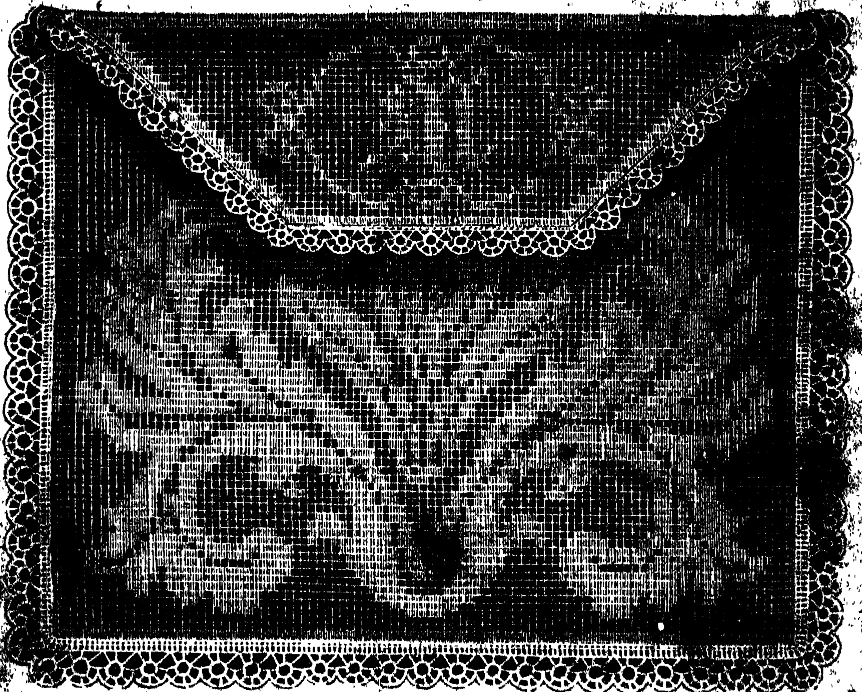
9th: Plain knitting.

10th: K. 1, k. 2 t., m. 2, k. 2 t., m 2, k. 4.

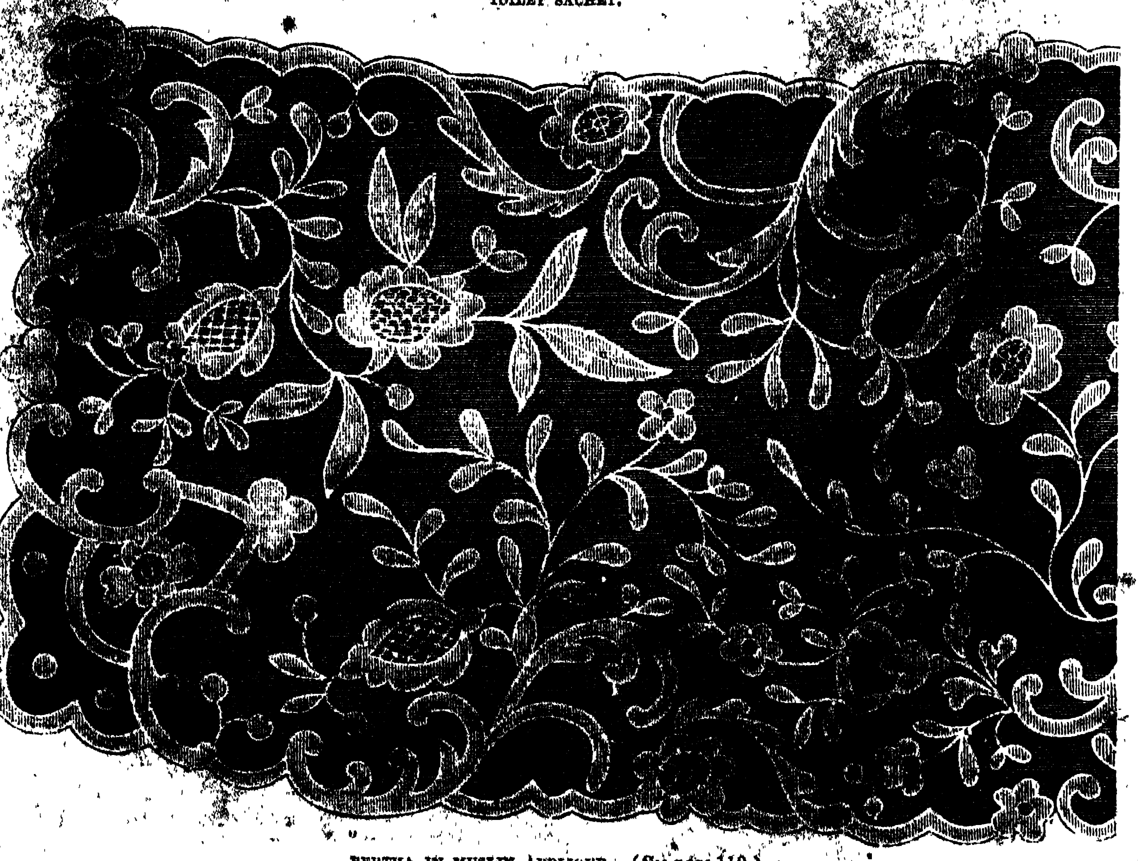
11th: K. 5, p. 1, k. 2, p. 1, k. 2.

12th: Cast off 3, k. 2, k. 2 t., k. 3.

28 patterns will be sufficient of this piece.



TOILET SACHET.



BERTHA IN MUSLIN APPLIQUE.—(*See page* 110.)

THE BATTLE OF SEMPACH.—ARNOLD WINKELRIED.

MOUNTAINS seem to be the favourite dwelling-place of Freedom. Like the eagle, she seeks the loftiest crags, and leaves the dull monotony of the plains to birds of more ignoble aim; nowhere has she kept her seat with more of unruffled grandeur and heroic courage than on the snow-crowned heights of Switzerland.

> "Here Freedom with the rustics sat,
> On Uri's rocks, in close divan;
> And winged that arrow, sure as fate,
> Which ascertained the sacred rights of man."

Every one has read of Tell—his clear eye and steady hand—and marvelled at the unconquerable will and courage, never to submit nor yield, which has enabled this handful of mountaineers to maintain their state, through centuries of war and turbulence, unpolluted by the yoke of a foreign invader, and undisturbed by domestic broils. They seemed to have caught some of the spirit which animated the ancient Romans, ere it died amidst the corruptions and debaucheries of the empire. For

> [illegible]

Amongst the [illegible] of personal interest [illegible] for the public welfare, [illegible] then became [illegible] cheap defence of [illegible] in undiminished [illegible] infantry soldiers. [illegible] cohorts of mountaineers [illegible] standing firm, with closed [illegible] fiercest charges of the [illegible] who first introduced [illegible] large masses of foot-soldiers [illegible] the battle was left to be decided by [illegible] were considered useless, except as archers.

The [illegible] soon spread. All Europe resounded with praises of [illegible] who could, on foot, bid defiance to the couched lance and galloping war-horse, and who, abandoning all resort to single combat, had successfully trained themselves to conquer or die shoulder to shoulder in great masses. Princes sought their aid, and offered them large pay to serve under their banners; and for many centuries the Swiss battalions were found in every battle-field all over Europe, marching to the conflict with the gladness and self-confidence characteristic of the men who looked upon war as an honourable means of earning their daily bread, let the quarrel be what it might. Everyone may remember their last great exploit, in the greatest of modern convulsions, when Louis XVI. fled in terror from the Tuileries, leaving eight hundred of his faithful Swiss Guard without orders or instructions, surrounded by an infuriate mob of 100,000 armed men, the dregs of the faubourgs. The sentinels on duty were one by one cut down, and the comrades stepped to fill their places, and when the officers, in desperation, gave the order to defend themselves, they fought and died with the calmness and silence of a parade, terrifying the surging crowd by the frightful coolness of their splendid discipline. But to return to our subject. For two centuries previous to 1386, the Dukes of Austria had been making a series of unsuccessful attacks upon the liberties of the Swiss cantons. [illegible] were invariably defeated by the valour of the peasantry. At last Leopold ascended the throne. He was a man of high spirit, great personal courage, and full of family pride. He was burning with the desire to avenge the reverses sustained by his ancestors in their attempts against the liberties of the country. The Swiss again united in a confederation to resist the aggressions of Austria and [illegible]. The chief [illegible] of complaint was the enormous [illegible] placed upon commerce, and the heavy [illegible] carried to the market. The peasantry felt that their very existence was at stake, and that, unless the obnoxious imposts were removed, they must die of hunger in their barren valleys.

(*See page* 114.)

Hermann Grunen, the Lord of Grunenberg, had in particular rendered himself infamous in the eyes of the people by his cruel exactions. The peasantry of the canton of Lucerne lost all patience, and some of the young men rose in arms, forced his castle-gates while he was at mass, and dismantled the fortifications, and drove him and his retainers out of the district without the loss of a single man. After this the excitement became every day greater. The heated imagination of the populace conjured up signs and omens before their eyes, portending the struggle that was about to take place. Flames of fire were said to leap nightly over the battlements of lordly towers. A man in armour was seen in the heavens flying before a man without armour. Everything combined to rouse the ardour of the peasantry, and natural appearances, which at any other time would have been considered unworthy of notice, were looked upon as sure omens of victory.

Leopold, about this time, returned in triumph from an expedition against Alsace, and swore to chastise the insolence of the Confederation. The feudal lords announced their intention of joining him, and in ten days the cantons received fifty-three declarations of war. The nobles were burning with the desire to wipe out the disgrace of former years, and only regretted that, on engaging in so noble a pastime, they had not enemies more worthy of their swords.

Uri, Schwitz, and Unterwald first rose in arms, and called upon the other cantons to join them. Berne alone held back. The first conflicts in the war were distinguished by the frightful atrocities committed by the nobles. Reichensee, a town which had given in its adherence to the Swiss, was taken by storm, and all who escaped the flames were put to the sword, without distinction of age or sex. Leopold's army was followed by carts carrying ropes to hang the prisoners.

It was believed that the Duke would attack Zurich, as his father had done, and the army of the confederates, numbering twelve [illegible] men in all, hastened to occupy it. He then suddenly changed his line of march, and directed his whole force against Lucerne and the other unprotected cantons. The Swiss then left Zurich to the protection of the burghers, and followed him. On the [illegible] of July, in 1386, they took up their position in a forest on the borders of Lake Sempach.

Leopold advanced to the attack with his splendid cavalry and mercenary infantry, composed chiefly of *reuters*, or strolling bands, from the south of Europe. On arriving at the foot of the hill, the nobles dismounted, and gave their horses to their squires, disdaining to fight in knightly fashion against "base lackey peasants." The contrast presented by the two armies was striking. The arms of the Swiss were mostly scythes, clubs, or clumsy spears; they had no protection against the weapons of their enemies but pieces of boards, fastened to their left arms, to ward off the first stroke; and they numbered in all only thirteen hundred men.

The Austrians, on the contrary, were cased in steel from head to foot, and as they marched onward, four thousand strong, their weapons glancing in the sun, and their gilt helmets glittering brightly in all "the pomp, and pride, and circumstance of glorious war," they presented an array that might well strike terror into the hearts of men less fearless than the hardy mountaineers who awaited their onset. But the battle is not to the strong alone; it is to the vigilant, the active, the brave; and the result of this was a striking instance of what may be achieved by strong arms and stout hearts.

The nobles formed themselves into a serried phalanx, the spears of the fourth rank projecting some feet in front, and thus advanced to the attack. The Baron de Hasenbourg, an experienced warrior, feared the determination of the Swiss, and advised the duke to send for a reserve which he had left behind, near Zurich. His cautions were laughed to scorn. The nobles, however, wished Leopold not to engage personally in the combat, or, at least, to remain on horseback. "What!" was his reply to their solicitations, "will Leopold of Austria look on while his barons are dying for him? No; I will either conquer or remain on the field."

The Swiss rushed on to the encounter with loud cries, but were obliged to halt suddenly before the wall of steel which opposed their progress. It was in vain that they attempted to break through the dense forest of lances, their best and bravest were flung back bleeding and dispirited. Their situation was every moment becoming more perilous. The wings of the Austrian army gradually advanced, so as to form a concave, and threatened to outflank and surround them. They were also in momentary dread of the arrival of the reserve, to attack them in the rear. The devotion of one man saved them, and won the victory.

Arnold Struthan de Winkelried, a native of the Canton of Unterwalden—(his name deserves a place in men's memories through all time)—rushed forward, and crying out, "I'll open a way for you! take care of my wife and children! Switzerland for ever!" grasped a number of spears in his arms, and forcing them together, suffered them to penetrate his own body. His countrymen rushed into the opening with sword and axe, and the nobles were routed with frightful slaughter. Their faithless squires had fled with the horses, and their masters, encumbered by their heavy armour, were unable to fly, and for many a mile were cut down without mercy. In the meantime the advoyer of Lucerne, the heroic Gundoldingen, the second hero of the day, was dying of his wounds. One of his countrymen approached, and asked him to entrust to him the fulfilment of his last wishes. But the subjects which at that moment occupied the thoughts of the dying magistrate were the liberty and happiness of his country. "Tell my fellow-citizens," said he, in a faltering voice, "that the last advice of Gundoldingen was never to allow any advoyer to continue in office longer than one year. This is the wish of one who prays that they may be crowned with victory and prosperity." This combat was decisive, and established the liberties of the Swiss upon a firm basis.

Of Winkelried we know nothing but his noble act; and of his words none have come down to us but the last and greatest. But such a death and such words, uniting in that awful hour, in so touching a manner, paternal affection and ardent patriotism, are sufficient to secure to him a glorious immortality. A rude monument over the fountain of Stantz, the chief town of the canton of Unterwalden, has been consecrated to the memory of the man and of the deed. His coat of mail was for a long time preserved in the Arsenal, and upon the wayside from Ennemoot, a lonely and mouldering chapel, hoary with age, known as Winkelried's Chapel, stood until the beginning of the present century. It was a simple and venerable monument; but the wars which rolled over Switzerland, in common with all the rest of Europe, at the commencement of the present century, swept away this and many other relics of the achievements of the grandest generation of a patriotic people.

Winkelried ranks next to William Tell in the estimation of the Swiss. His exploit has been celebrated in many a homely ballad, and his memory is enshrined in the hearts of the people. One of our poets (James Montgomery, in his "Wanderer in Switzerland"), has paid a tribute to the departed hero in strains too stirring to be withheld:—

"'Make way for liberty!'—he cried;
Made way for liberty, and died!

"It must not be: this day, this hour,
Annihilates the oppressor's power;
All Switzerland is in the field,
She will not fly, she cannot yield—
She must not fall; her better fate
Here gives her an immortal date.
Few were the numbers she could boast,
But every freeman was a host,
And felt as though himself were he,
On whose sole arm hung victory.

"It did depend on one indeed;
Behold him—Arnold Winkelried!
There sounds not to the trump of fame,
The echo of a nobler name.
Unmarked he stood amid the throng,
In rumination deep and long,
Till you might see with sudden grace,
The very thought come o'er his face;
And by the motion of his form,
Anticipate the bursting storm;
And by the uplifting of his brow,
Tell where the bolt would strike, and how.

"But 'twas no sooner thought than done,
The field was in a moment won:—
'Make way for liberty!'—he cried,
Then ran, with arms extended wide,

As if his dearest friends to clasp;
Ten spears he swept within his grasp;
'Make way for liberty!'—he cried,
Their keen points met from side to side;
He bowed amongst them like a tree,
And thus made way for liberty.

"Swift to the breach his comrades fly;
'Make way for liberty!'—they cry,
And through the Austrian phalanx dart,
As rushed the spears through Arnold's heart;
While instantaneous as his fall,
Rout, ruin, panic, scattered all:
An earthquake could not overthrow
A city with a surer blow."

"Thus Switzerland again was free;
Thus death made way for liberty!"

STATISTICS OF THE MANUFACTURES OF PARIS.

M. Blanqui, the able exponent and defender of the principles of free trade in France, calculates the value of the annual produce of Parisian industry at from £55,534,000 to £55,578,000. There are 325 principal branches of trade, and 64,000 masters, each of whom pay for what is termed a patent,—that is, a license to carry on any particular trade, the price of which license varies according to the nature of the business or profession of the holder. There are also 342,530 workpeople, of whom 204,000 are men, 112,000 are women, and 26,530 children.

Paris is divided into 12 districts, termed *arrondissements*. The first arrondissement, in which the carriage trade is carried on, produces to the value of £4,046,000. The second arrondissement produces £7,021,000. The third employs 32,000 workmen, producing £5,038,000. The fourth gives employment to 21,000 workmen, producing £2,856,000. The fifth employs 51,000 people, producing £6,704,000. The sixth employs 63,000 workmen, and produces £9,822,000. This last arrondissement is especially Parisian. In it the artisan is, as it were, a magician, a Proteus: he excels in every branch. The raw materials used are of little value; it is the skill and genius of the Parisian artisan which gives a money value to materials intrinsically worthless. It is here that Paris goods are manufactured—fancy turnery, buttons, brushes, canes, umbrellas, jewellery, plated work, lace, and a hundred thousand marvels of ingenuity known and sought after in every part of the world. The production of colours for painters forms a very successful branch of Parisian industry, as does also the manufacture of artificial pearls. They are made of small globules of glass, filled with a substance called "oriental essence," but which is, in fact, but the scales of a small fresh-water fish, softened in ammoniacal water.

The seventh arrondissement gives employment to 41,000 workmen, and produces £[illegible]. It is very nearly related in character to the sixth. The eighth employs [illegible] workmen, and produces £[illegible]. This is the quarter for cabinet-making, paper-hanging, carpenter's work, and brewing. The ninth numbers 15,000 workmen, producing £2,182,000. The tenth employs 20,000 workmen, producing £2,697,000. The eleventh numbers 19,000 workmen, producing £2,499,000. Lastly, the twelfth, which is the great quarter for tanners, rag merchants, and brewers, numbers 70,000 workmen, producing £3,967,000. Amongst the special branches of industry noticed by M. Blanqui, are those of bronze work, unrivalled throughout the world, and producing £793,000; hat making, producing £[illegible]; glove making, producing £635,000. In the manufacture of bronzes, silver work, filigree, and imitation jewellery, the Parisians are considered extremely clever workmen, and many thousands are employed in the production of these luxurious adjuncts of civilisation. The clocks, vases, chandeliers, cups, lustres, and so forth, of Paris, are deservedly celebrated, and may be found in every capital of Europe. Paris, despite its gaieties and frivolities, is much more of a manufacturing city than London. The wages vary amongst this immense population of workpeople from 2d. per diem, to from 28s. to [illegible]s. per week. The average wages is 3s. 2d. a day for a man, and 1s. 4½d. for a woman. In the manufacture of fancy soaps great numbers of persons find employment. In one establishment in Paris alone there are used annually, for the scenting of toilet soaps, 80,000 lbs. of orange petals, 54,000 lbs. of rose leaves, 32,000 lbs. of jessamine flowers, 32,000 lbs. of violets, 20,000 lbs. of tuberose, 16,000 lbs. of mignionette, and 16,000 lbs. of lilac.

NEST-BUILDING FISHES.

The *Gasterosteus*, or Stickleback, as it is more commonly called, is a very small but very plentiful fish, having its back and belly furnished with prickly bones, somewhat like thorns, and a sort of scaly cuirass extending along its body. What is most remarkable about it, however, is the great attention paid by the male to its offspring. It constructs a nest for them with as much care, though of course not so much ingenuity, as a bird, and for this purpose carries small pieces of plants in its mouth, often from a great distance. All these pieces, together with minute particles of sand, it collects into one spot, and, having allowed them to settle at the bottom, it smears them over with a sort of glutinous excretion, which attaches them firmly. It then presses them together by a peculiar movement of the body, frequently striking the mass with its pectoral fins, as if to ascertain whether it has acquired the necessary consistency.

Singularly enough, each fish labours alone, and guards its work with the most watchful jealousy. Murderous conflicts sometimes take place when two or more of the little architects dispute the possession of any of the necessary materials. Without any other instrument than its mouth, each glues together pieces of weeds, of old roots, of sedge, and placing them lengthwise, generally so as to form a cavity somewhat resembling a lady's muff in shape, the roof being arched over with the utmost care, and the glutinous mass of which we have before spoken, always forming the foundation. The entrance is always from above, and the utmost care is taken to make it as smooth and as even as possible, so that the owner may glide in without any difficulty.

The fact that it is the male which does all this, makes it one of the greatest anomalies in natural history. Amongst the lower animals it is the female which foresees all the wants of the young, and provides them with food and shelter. But the male stickleback not only fits up the dwelling-place, but during the breeding season nature clothes him in the gayest colours, in which he displays himself at the entrance of the nest, to attract the females to deposit their eggs in so commodious a mansion. The belly, instead of the ordinary white colour, assumes a roseate hue, and the grey of the back gives place to blue, or a sort of silvery green.

As soon as the fish has finished its nest, and put on this brilliant livery, it goes in search of the females which are about to spawn, to induce them to follow him, and deposit their eggs in the receptacle which he has prepared with so much care. He shows them the nest, he enlarges the entrance, and, in fact, pushes them in. As soon as one has left, he goes in search of others, and the quantity of eggs which thus accumulate at last becomes very great. But his task is not finished. He has still to watch and defend them until they are hatched, against the attacks of other fishes, and even of the females, which, strange to say, are extremely fond of feeding on spawn. Having carefully tended the eggs, when the young come forth, he supplies them with food, and defends them from violence with as much assiduity as that of a hen towards her chickens, until they are able to provide for themselves.

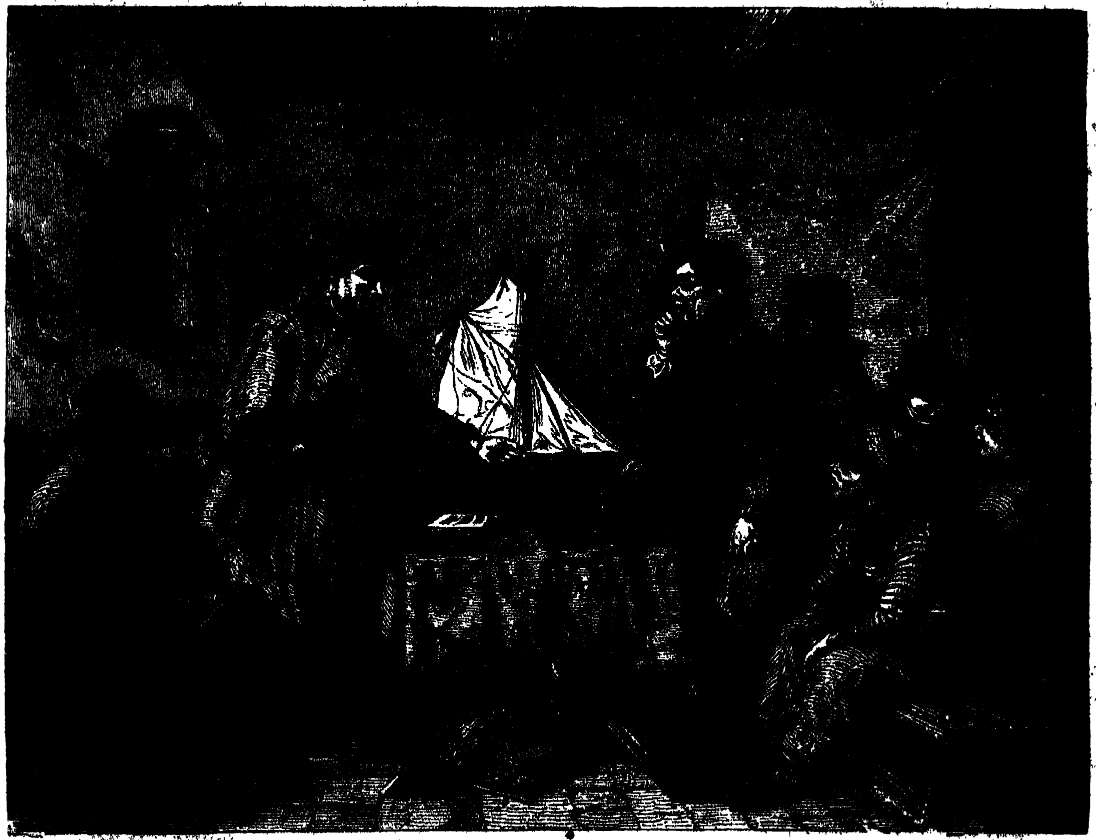
A French naturalist, M. Coste, some time ago gave great attention to the habits of the stickleback. He has watched the whole process of the construction of the nest, the laying of the eggs by the female, and the care taken of them by the male. He has seen him supply the young with food, and defend them, and lead them out when they have become sufficiently hardy to leave the nest, that they may become acquainted with the surrounding localities; and, in short, has discovered a thousand striking analogies between its habits and those of birds. Some of the details with which he has furnished us are certainly very curious. "The stickleback," says he, "has the foresight to cover the nest heavily with sand, to prevent its being swept away by the waters; and they glue together the materials of which the nest itself is composed, by means of the mucous excretion which exudes from their bodies. To make sure that all parts of the nest are united with sufficient solidity, the fish suspends himself in the water immediately above it, with his head downwards, and makes rapid vibrations with his pectoral fins and his tail. By this means any parts of his dwelling which are not properly constructed at once become loose and detached, and he instantly darts down and repairs the defect. During an entire month, he is the sole guardian of the eggs which the females lay within, and he has to defend them, not only against the attacks of other fishes, but against the ferocious and unnatural appetites of the parents themselves. He removes the stones which accumulate at the mouth of the nest, he enlarges the opening, and by the singular vibrations of his tail and fins he changes and purifies the water in the neighbourhood; and, in short, he never relaxes his tender care of the young until they are fully able to provide for themselves."

NEST OF THE GASTEROSTEUS, OR STICKLEBACK.

At the meeting of the American Association at New Haven, Professor Agassiz made an interesting communication on the "care which certain fishes take of their young." After referring to the general disbelief with which stories of fishes taking care of their young have been received, he stated that recently, while engaged in collecting insects along the shores of Lake Sebago, in Maine, he was led to observe the actions of a couple of cat-fish, which at his approach left the shore suddenly and returned to deeper water. This movement being several times repeated, he was led to a closer observation. The peculiar black appearance of the place which the fishes had left first attracted his particular attention. Examining more closely, a nest was discovered, in which were moving a number of little tadpoles. These were at first taken for the tadpoles of frogs, and, to test the attachment of the old fishes to the spot, Professor A. took some pains to experiment upon them. Pausing for a few minutes, the two fishes returned slowly and cautiously, looking anxiously towards the nest to see if it had been disturbed. They approached to within six or eight feet of where he stood. They were evidently not in search of food, and he became convinced that they were seeking the protection of the young. Large stones thrown repeatedly into the middle of the nest, after these fishes had returned to it, only served to frighten them away for a brief period; they invariably returned to the spot within ten or fifteen minutes afterwards. This was repeated for the fourth and fifth times, with the same result. The nest was in a depression among the water-plants.

THE YOUNG SAILOR PUZZLED.

And well he may be, in presence of the experienced old pilot, who is examining him! Well may he be disconcerted when, after his first voyage, he is questioned about "mainsails" and "topmasts," "flying jibs" and "spankir booms." "When a mere tyro is examined by a professor," says Rabelais, "it is like running down a young hare with an experienced hound." Such an examination is enough to disconcert the boldest. There are few of us who have not, at some period of our lives, stood in just the same predicament as the young sailor-boy. The commoner of St. Boniface, who has crammed for his "little go," stands abashed and puzzled at some simple question from his begowned and reverend examiner. The medical student, who has worked hard at home, and been punctual at "lectures" for at least the six months previous to his "going up," blushes and stammers when some old practitioner—an Abernethy, for instance—asks him what he would do in such and such a case of dislocation, or what he would prescribe in such and such a fever! The military cadet, who is known as the boldest, wickedest, cleverest lad in the college, all at once loses courage when some rough old general propounds a point of engineering tactics in a manner different to what it is commonly taught in the books. The best scholar in the whole school, the top of the class and the pet of the master, casts down his eyes when, at some Christmas show-day, a quiet-looking man in spectacles inquires of him respecting some Greek root. And thus it is with all of us. Pride ourselves as we will on our knowledge and experience, we are certain to find some one who knows better than we. And it is just possible—*just* possible, we repeat—that even the examiners themselves might be puzzled were they submitted to a like ordeal. Just possible that the old pilot, who knows every rope of the ship, can talk learnedly of her "lines" and "points," and is capable of holding forth for an hour at a time on all matters of seamanship, would pause if questioned about affairs not pertaining to his profession; nay, not only possible, but very likely indeed. This brings us back to our picture.



(*From a Painting by R. Jordan.*)

It appears that a number of youths have come before an old pilot, to be examined by him as to their proficiency in navigation. On the one side are the examiners, and on the other, the candidates. If the aspect of the first is not quite so magisterial as it might be, the puzzled look of the young sailor under trial, with finger on lip and half-closed eyes, is a sufficient evidence of the nature of the examination. And the varied expressions of the lads: one attempting to prompt his friend in a whisper, another making inquiry of his fellow as to the matter under discussion, and a third, in whose whole person—face, hat, body, arms, legs, feet,—is shown but one feeling of profound attention;—is not the whole a triumph of artistic composition? The benevolent look of the questioner, in which just a shade of raillery peeps out, is well contrasted with that of a sitting figure, who appears to view the proceedings with considerable interest—just as a father might, were his own son standing in the place of the young sailor. The globe and maps, the inkstand and books, the *impromptu* table—on which an old sail does duty for cloth—the rough seats, the homely walls, and the timber roof of the apartment, are all in character. Upon the success of the manœuvre concerning which the pilot is questioning the youthful group, may depend, some day, perhaps, the lives of themselves and others; and who can tell how many tender feelings may be bound up with the welfare of those lads? Out upon the wild sea, they are unknown or forgotten by the world. They go and come upon their adventurous voyages, and are only so many carriers of merchandise from land to land. They grow up to be men, and pursue the same career, and we take no heed of them ashore. They are paid their wages, and they spend them—the *how* we seldom inquire into—and go to sea again. But as they sail across the broad Atlantic, or are idle, ice-locked for months together in the Polar seas, it may be that there are hearts at home which fondly beat for the rough, uncared-for sailor. Society owes him no small debt of gratitude and duty.

KINEMATICS; OR, THE TRANSFORMATION OF MOTION.

THAT part of the science of mechanics which relates to the means by which the direction and velocity of *one given motion* may be transformed into those of another, is called, by eminent writers on the subject, "Kinematics," from the Greek verb *kineo*—to put in motion. The first work in which any attempt was made to treat the subject systematically, was the *Theatrum Machinarum* of Leupold, published in 1724. The next important step was made by Monge, who delivered lectures on the subject at the *Polytechnic School, in Paris*, in 1794. The system adopted by this celebrated geometer, was partially modified and published by MM. Lanz and Betancourt in 1808, under the title of "An Essay on the Composition of Machines." Ampère pointed out the proper method which should be pursued in treating of this subject, in his "Essay on the Philosophy of the Sciences," published in 1834. Lectures on Mechanism, including the doctrine of Kinematics, were for the first time delivered in the University of Cambridge, in 1837, by Robert Willis, M.A., F.R.S., Jacksonian Professor of Natural and Experimental Philosophy. His ingenious and original views on this subject have since been published in his work entitled, "Principles of Mechanism," London, 1841.

As the last-mentioned Author's treatise might be considered too abstruse for non-mathematical readers, we shall confine our remarks and illustrations on this subject chiefly to the system of MM. Lanz and Betancourt. According to their views, the motions of the parts of machines are either *Rectilinear*, *Circular*, or *Curvilinear*; that is, *in a straight line*, *in a circle*, or *in a curve*; and each of these may be *continuous* or *alternate* in direction—that is, uniform or reciprocating. The six motions arising from this combination admit of being again combined two and two, in twenty-one different ways, each motion being supposed also to be combined with itself. The object of every simple machine being to counter-change or communicate these motions, the following systematic table will include them all.

TABLE OF THE TRANSFORMATION OF MOTIONS.

I.—*Continuous Rectilinear Motion* may be changed into
1. Continuous Rectilinear Motion.
2. Alternate Rectilinear Motion.
3. Continuous Circular Motion.
4. Alternate Circular Motion.
5. Continuous Curvilinear Motion.
6. Alternate Curvilinear Motion.

II.—*Continuous Circular Motion* may be changed into
7. Alternate Rectilinear Motion.
8. Continuous Circular Motion.
9. Alternate Circular Motion.
10. Continuous Curvilinear Motion.
11. Alternate Curvilinear Motion.

III.—*Continuous Curvilinear Motion* may be changed into
12. Alternate Rectilinear Motion.
13. Alternate Circular Motion.
14. Continuous Curvilinear Motion.
15. Alternate Curvilinear Motion.

IV.—*Alternate Rectilinear Motion* may be changed into
16. Alternate Rectilinear Motion.
17. Alternate Circular Motion.
18. Alternate Curvilinear Motion.

V.—*Alternate Circular Motion* may be changed into
19. Alternate Circular Motion.
20. Alternate Curvilinear Motion.

VI.—*Alternate Curvilinear Motion* may be changed into
21. Alternate Curvilinear Motion.

Each of these combinations has also its converse. Thus, in No. IV., continuous rectilinear motion may be changed into alternate circular motion; and, conversely, alternate circular motion may be changed into continuous rectilinear motion; so that the whole number of possible combinations is thirty-six, rejecting duplicates. Of many of these twenty-one combinations, however, no direct solution can be given; hence, the authors above mentioned have confined their elementary combinations to twelve distinct heads. Of these, we shall give the most important and useful.

To change one continuous rectilinear motion into another.—This problem is effected by passing a cord over a single fixed pulley, as in the motion of window-blinds; or by the application of any system of cords and pulleys employed to alter the direction and velocity of a given rectilinear motion, as in manœuvring the sails of vessels. In this problem may be included the apparatus employed for drawing a series of straight lines parallel to a given straight line, and known by the name of *parallel rulers*. Varieties of these are represented in figures 1, 2, and 3.

Fig. 1.

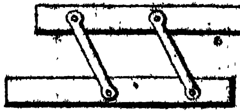


Fig. 2.

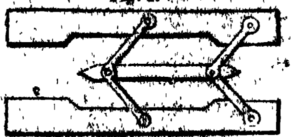
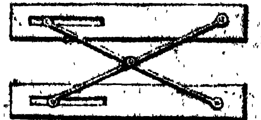
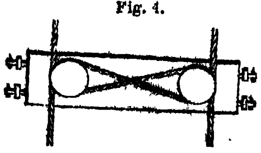


Fig. 3.



The ingenious method by which perfect parallelism and equable tension are preserved in the spinning of cotton and other threads is represented in Fig. 4.; where a frame is mounted on four small wheels, carrying two pulleys, whose axles are fixed on it so as to work horizontally; and two cords are placed in a parallel position, in the direction in which the frame is to move, and pass round the two pulleys in the form of the letter Z; so that, by pushing the frame or drawing it back, its parallelism is secured.

Fig. 4.



The inclined plane may also be used to produce rectilinear motion in a direction at right angles to its base, by securing a beam in a vertical position between four or more guide-rollers, so that it is free to move vertically, but not laterally, and applying a force at the back of the plane—considered then as a wedge—to urge it in the direction of its base; this motion will then cause the beam to rise through a height proportional to the space passed over in the horizontal motion.

To change a continuous rectilineal motion into a continuous circular motion, or conversely.—This may be effected by a rack, or straight indented bar, working on a toothed wheel, the continuous rectilineal motion of the former producing the continuous circular motion of the latter, or conversely. A strap passing round a wheel, and turning it by its friction on the surface or groove in which it works, will attain the same end, when the resistance is not too great. In cases where the resistance is too great, a chain and rag-wheel, or a rod with pins and wheel with notches, may be used. These motions are exemplified in figures 5, 6, and 7.

Fig. 5.

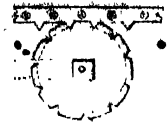


Fig. 6.

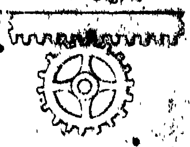
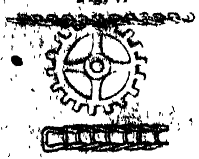


Fig. 7.



The wheel and axle, the capstan, the jack, the screw and nut, are all solutions of the reciprocal of this problem. The differential screw, represented in Fig. 8, is a cylinder divided into three parts, of which the two extreme parts carry two equal screws, and the middle part one whose thread differs from that of the other two by a very small quantity. The former turn in two fixed nuts, and subsequently move by a quantity equal to their thread at every turn of the winch. To the middle screw is attached a moveable nut, having an arm which slides in a groove parallel to the axis of the cylinder, so that at every turn of the winch, this nut moves forward by a quantity equal to the difference between the threads of the middle screw and the extreme screws.

The differential wheel and axle, represented in Fig. 9, is constructed on the same principle, and exhibits a transformation of motion similar to the preceding, but perpendicular to the axis of the machine. The weight is raised at every turn of the winch, by a quantity equal to half the difference of the radii of the two axles.

Fig. 8.

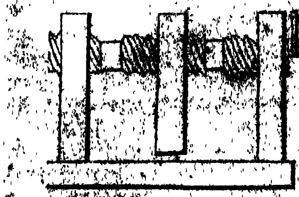
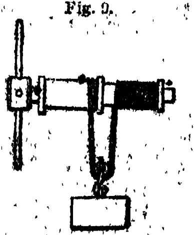
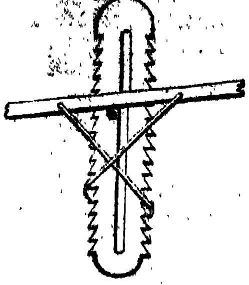


Fig. 9.



To change a continued rectilinear motion into an alternate circular one, and conversely.—This problem is solved by a rack and lever working into its teeth, or a rack and toothed sector, in the manner adopted by Watt in the first specification of his double-acting steam-engine, for producing the reciprocating motion of the working beam. A mode of performing the converse of this problem is represented in Fig. 10, where a double rack, moveable in a vertical direction, is supported by two small hooked levers, which cross each other, and by the fixed horizontal axis of a large lever moveable round it, which traverses a longitudinal groove in the double rack, produces the transformation. The two small hooked levers are moveable round their centres, which are attached to the great lever. By giving to the latter an alternate circular motion, the bar rises and takes a continuous rectilinear motion.

Fig. 10.



The actual transformation used in machinery consists in transforming the alternate circular motion into a continued circular motion, by means of a connecting-rod and crank; and the latter into a rectilineal motion, by means of a rack or a cord winding on an axle.

To change a continuous circular motion into an alternate rectilinear one, and conversely.—This problem is solved by the following apparatus, represented in Fig. 11. A wheel, worked by a winch, and turning on its centre, carries a pin which slides in the groove of a horizontal bar, placed in the form of the letter T on a beam moving vertically between guides, whose ends are seen in the figure. As the wheel revolves, the pin moves backward and forward in the groove of the bar, and raises and depresses the beam through the guides in the same vertical direction.

Another solution is represented in Fig. 12. A wheel, having wipers, or curved teeth, placed on its circumference, is placed in connection with a stamper, or vertical beam, furnished with a projecting shoulder or pin; and, as the wheel revolves, the stamper is lifted by each wiper, and falls when disengaged from it; it is then lifted by the next wiper—and so on. This apparatus, as the figure indicates, is employed for the purpose of pounding hard materials.

Fig. 11.

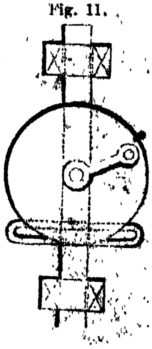
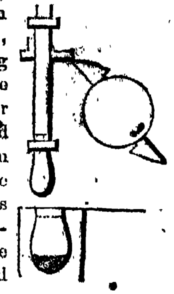
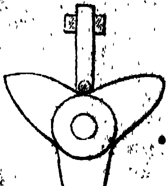


Fig. 12.



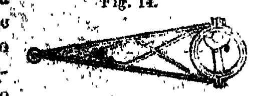
The curve called *cardioide* furnishes a third solution. If, for example, a vertical bar, kept in its position by guides, is required to rise and fall three times alternately for every revolution in a continuous circular motion, the axle or wheel is provided with three great symmetrical cams, to answer the required purpose; as represented in Fig 13.

Fig. 13.



Instead of the cardioide, circular eccentrics are used for the same end, as represented in Fig. 14. Within a circular metallic ring is fitted a circular metallic plate, capable of turning freely within the ring, and revolving not on its centre, but on a point at some distance from it. The ring is connected by a shaft and joint, with a rod moving in guides. The eccentric motion of the plate causes the ring to move alternately in opposite directions, and through a space equal to twice the distance of the axis from the common centre of the ring or circular plate; this communicates, through the shaft and joint, an alternate rectilinear motion to the rod which works in the guides.

Fig. 14.



An eccentric may be considered as a system of connecting-rod and crank, in which the crank-arm is variable; or, more generally, a curve which revolves with an axle, without being concentric to that axle, and producing the transformation of continuous circular motion into alternate rectilinear motion.

The cardioide of Vaucanson, represented in Fig. 15, is a symmetrical eccentric, by means of which the uniform motion of a horizontal axle produces a similar alternate one in a vertical rod placed in the plane of the revolving axle.

Connecting-rods and cranks are also often used for the transformation of continuous circular motion into alternate rectilinear, as in Fig. 16.

Fig. 15.

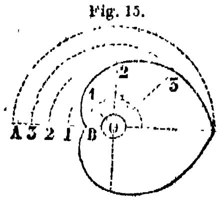
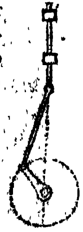


Fig. 16.



There is an elegant solution of this problem founded on a geometrical property of the circle, represented in Figs. 17 and 18; where the former is the front view, and the latter the side view. A small toothed wheel, which is put in motion by a winch, works in the interior of an annular wheel of double its diameter. While its centre is describing a circle round the centre of the large wheel, the point of its circumference which was highest, and in the vertical line, at the beginning of the motion, remains always in this vertical line, rising and falling alternately along the diameter of the great wheel. This is called White's parallel motion.

Fig. 17.

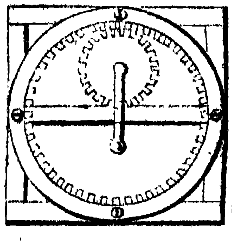
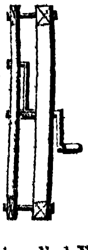


Fig. 18.



To change one continuous circular motion into another.—The mill-geering represented in Fig. 19, the straps and the chains which transmit the motion of the principal shaft of a machine to the axles and secondary wheels, present frequent examples of this transformation.

Fig. 19.

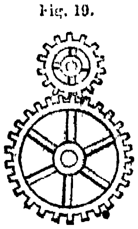
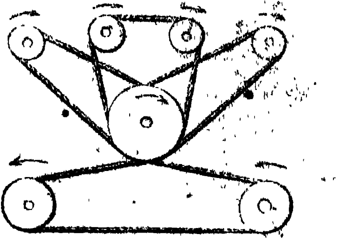


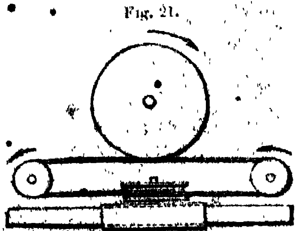
Fig. 20.



An endless cord passed round pulleys placed at variable distances in the same plane, and which communicate in the direction indicated by the arrows, represented in Fig. 20, the motion which one of them receives from any driver, is another example.

The means employed to transmit, with an endless cord, the motion of the driver in a plane perpendicular to that in which it moves, is represented in Fig. 21.

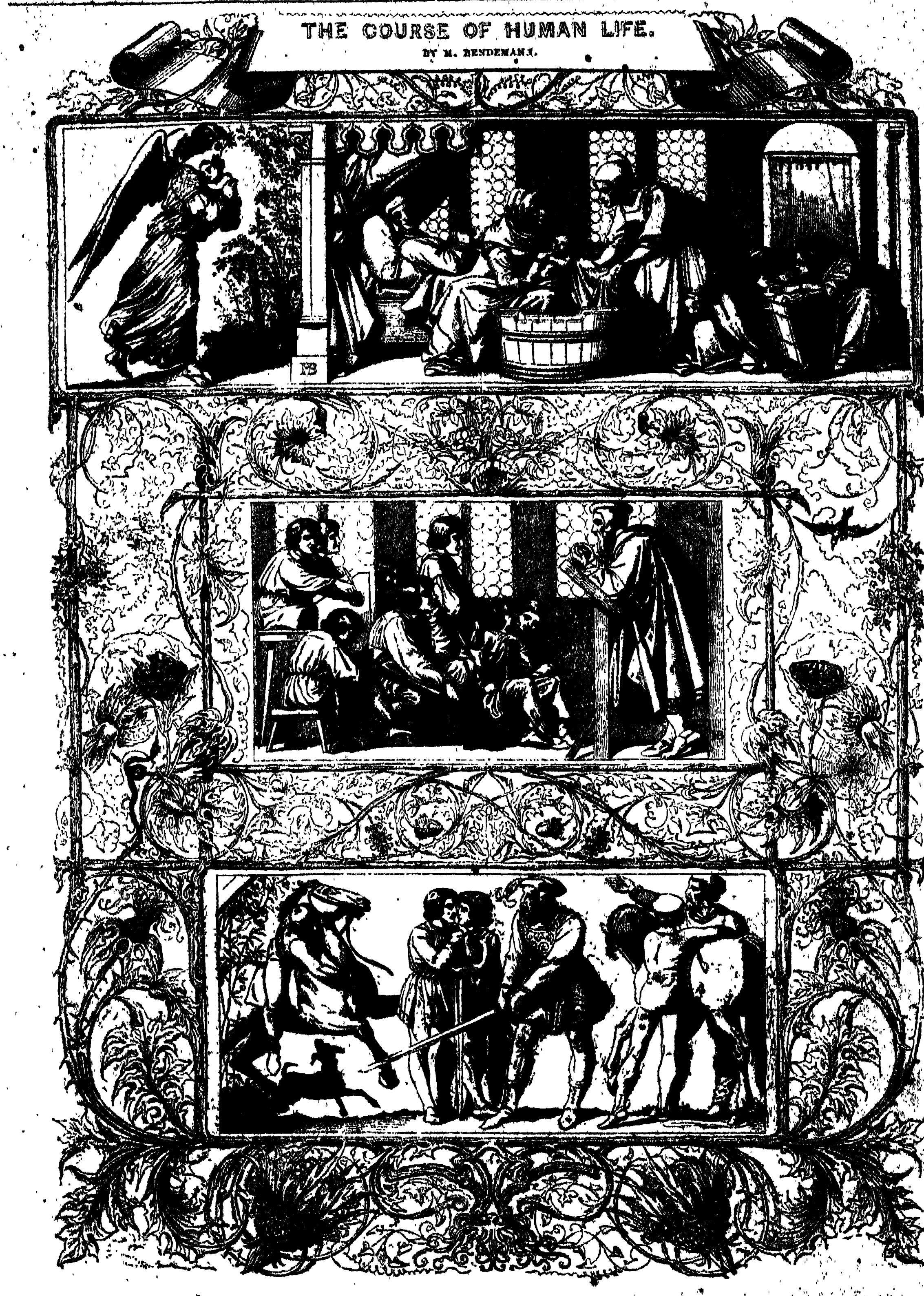
Fig. 21.



(To be continued.)

THE COURSE OF HUMAN LIFE.

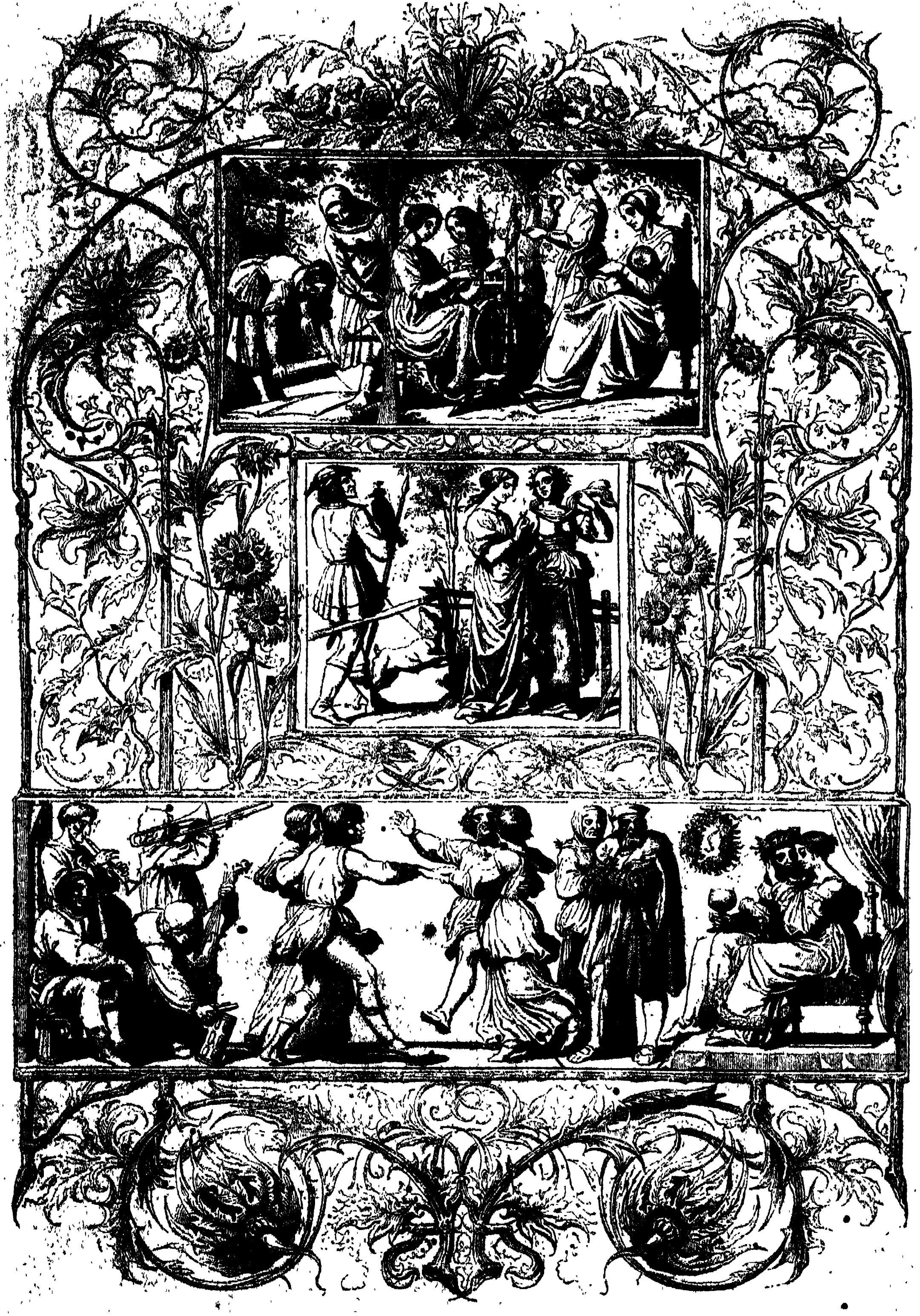
BY M. BENDEMANN.



The guardian angel has brought another human being on earth. The infant is in the arms of the nurse, and the mother, with clasped hands, is thanking God that her son has now a sister. A few years pass by, and they learn their earliest words. Hand in hand they enter eagerly into all the joys and sorrows of their age. Their first teachings, and freshest pleasures are all in common. At length the day arrives on which it has been decreed by the unbending laws of society that their paths must separate for ever:—

> "Years have passed, and left their trace
> Of graver care and deeper thought,
> And unto him the calm, cold face
> Of manhood, and to her the grace
> Of woman's pensive beauty brought."

Before the brother lies the stormy sea of life, with its intoxicating freedom, and too often dearly-bought experience. He may drink deeply of its pleasures, but he can never escape its duties. He may be called upon to rule, to legislate, to plead, to fight; but



let the responsibility be what it will, he has need of a clear head and a stout heart, to listen with patient docility, and to think with persevering faithfulness—to avoid the too common error of believing that his mission is either to renew the world, or to invent a new mode of life. He has to take it as he finds it, and the use of the experience and wisdom of the aged is to teach him how he may best adapt himself to the circumstances around him. And while he purifies his intellect by study, he must not forget to strengthen his body by exercise. Life is a great *mêlée*, in which every man is for himself, and God for all. The keen eye and the strong arm win the laurels. A robust constitution is an indispensable requisite to success. He who seeks to win fame on the battle-field, must have a hand in which cold steel will not tremble; and whether on tented field or in halls of council, "that he can toil wonderfully" is one of the best things that can be said of any man, and it can never be said of him whose frame is light and fragile.

But what of her who was the companion of his careless boyhood? While he has gone out to buffet the billows of worldly strife and turmoil, her life has been a course of unobtrusive goodness, occupied in those minor duties which take up the lives of so many women, which, as they require no effort, cause no pang, and give no triumph. Our engraving shows her rolling up the bleached linen, or carrying their dinner to the reapers, and, doubtless, envying the joys and duties of the young mother at her side. The hour of labour is past. She has gone into the fields at eventide with her companion. They are thinking—and doubtless talking, too, —of the "nearer and dearer one still than all other," to whom her own and her mother's hopes have so long been pointing. He, behind her, returning with his dog and his falcon from the chase, and as he passes he looks after her. The wishes of their parents will doubtless speedily be fulfilled, and crowned with "the rose, the flower of love," they will enter with the music and the dance upon that life which their fathers are closing in labour and sorrow. Not one link drops in the great chain of human existence, but there is another directly inserted to fill its place. At the side of every tomb there is a cradle. For him who does not seek earnestly to learn what part he fills in the great plans of the Almighty, all is disappointment; but for him who looks upon himself as but a spark of the great celestial fire, the present and the future are full of delightful assurance.

Our engravings are taken from the paintings by Bendemann, which adorn the Throne Room of the Royal Palace at Dresden. The ornaments, however, do not exist in the originals. All Bendemann's works are not less remarkable for their simplicity and truthfulness than for the depth and soundness of their philosophy.

A CARD.

We confess to feeling a strong interest in the condition, intellectual, moral, and social, of the working classes. We have done so from our very childhood. It is either a part of our nature, or a very early graft upon it. We rejoice in their joys, sorrow over their sorrows, and exult in every fresh proof of their welfare, progress, and improvement. It was, therefore, with no small degree of pleasure and satisfaction that we looked upon the following card, which was put into our hand only yesterday:—

"KETTLEWELL AND HARRISON, ALTHORPE,

Beg to inform their friends, and agriculturists generally, that they have recently purchased

A PORTABLE STEAM THRASHING MACHINE,

with which they will be able to perform their work much more expeditiously, and in a very superior manner. They have also an excellent

HORSE-POWER MACHINE.

K. and H. beg to say that their very best attention will be given to those who may favour them with their commands, and no exertion will be spared to give the most entire satisfaction.

January 1st, 1852."

"Is this the card you spoke of?" we can fancy some superficial or apathetic people exclaiming. "Well, what of it?" Yes, it is the card we spoke of, and we think much of it. We look upon it as "a great fact," almost in itself sufficient to stamp the year 1852 with the character of the *annus mirabilis*, which so many persons have been conferring upon it by anticipation. Let us state the grounds of this opinion, and of the pleasure which we derive from it.

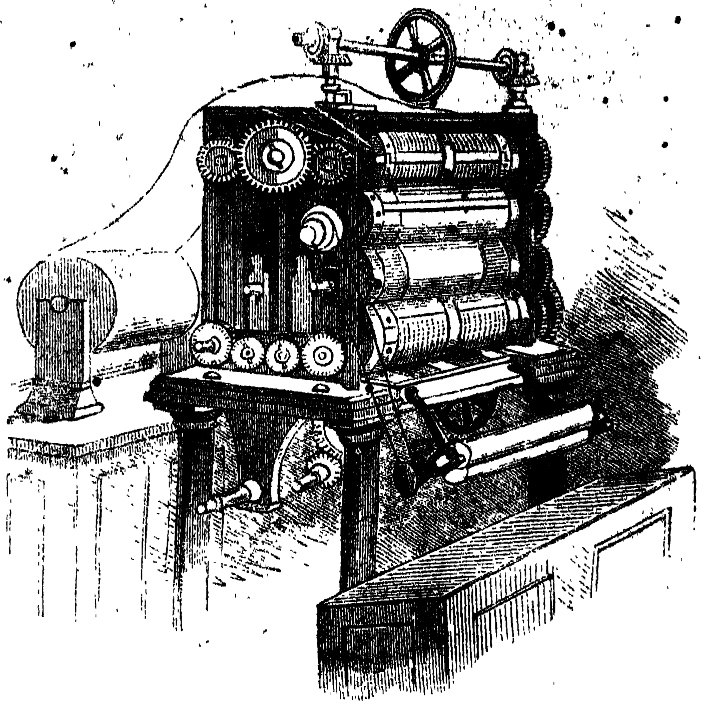
1. Men yet alive, and, indeed, hardly of middle age, can recollect the absolute horror and rage with which the working classes, both in the manufacturing and agricultural districts, regarded the introduction of machinery into their several trades and callings. They considered steam-power, especially, to be a terrible rival, destined to supersede the human energies; and, utterly ignorant of the new ramifications of labour and employment which it would develop, rushed blindly, and with mad ferocity, into outrages which gave us, at one time, "a black assize" in many a county. But all this is over. Education has been at work. Thought and reflection have come to the rescue, and, by their assistance, common sense has ascended its throne in the minds of the millions from which it was so long excluded by the usurper—Ignorance. We appeal, as a mighty proof of this position, to the foregoing Card. Kettlewell and Harrison, by whom it is issued, are no capitalists. They are no mechanists. They are not even farmers, anxious to repay themselves for their outlay on such improvements by extending their sphere of action to their less enterprising or less wealthy neighbours. They are, on the contrary, two hard-working, industrious, agricultural labourers, living at Althorpe, in the Isle of Axholme, a district of England, which is a *terra incognita* to most of our countrymen, and of which we intend to write at large some day. Is it not, then, we would ask, most satisfactory to hear of such things being done and undertaken by two labouring men, in a secluded village on the banks of the Trent, in the remotest corner of Lincolnshire? It shows that, like the dropping of water, education has been silently going on, and making its way even in quarters where we least expected to find it producing such substantial fruits. *Eureka.* This is something to talk of and something to boast of, and we rejoice to tell it. There is something more delightful to us in this page, from the simple annals of the poor, than in all the startling facts which pour upon us in daily accumulation from the big, bustling, grasping, struggling, fighting world, to which so many give their excited and uninterrupted attention. We think more of Kettlewell and Harrison's Card than of Napoleon's proclamations, and infinitely more of their Portable Steam-Thrashing Machine than of his blood-stained *coup d'etat*.

2. And, farther, look at the thing in another point of view. What habits of industry and steadiness does the ability to launch into a speculation betoken on the part of two agricultural labourers, both young men, as yet *under* the age of thirty. This is not the least pleasing feature of the matter. It tells of a moral improvement, as well as an intellectual one, among the workers in the rural districts, which many would have doubted, some denied. There is no room for idleness, no room for drinking, in a case like this. The public-house can have had no charms for such men as these. Day by day they must have added to their little savings—little at first, until the store grew to the point which it has now reached. What was the glory of Waterloo to the honest pride with which these poor fellows, after calculating the cost and the amount of their hoard, gave the order for a "STEAM THRASHING MACHINE." What is the pleasure of writing, "We, Nicholas or Francis," to some exterminating decree, compared with the thrilling delight with which these sons of toil would read their names in print, in large letters, KETTLEWELL and HARRISON.

It is with no ordinary feeling of gratification that we help to embalm and immortalize them in these pages. Go on and prosper. George Stephenson had a less beginning, and so had Joseph Paxton. The world is before you. Press forward. And to your fellow-labourers in that district,—we are told, proverbially an industrious race—we say, "Go, and do ye likewise." We glory in this one card. What a day it will be for working-classes when the game shall be played by a whole pack of them. And, verily, unless the signs of the times, unless bright hope deceive us, it is coming. The dawn is in the eastern sky. Lighter and lighter grows the morn. The sun cannot go back upon the dial. We press on towards meridian brightness. It may not be here as soon as some enthusiasts anticipate. But the tendency is in the right direction. The wave may even recede now and then, but it will only be to advance higher and higher. We are believers in man's capabilities, are certain of his improvement since our eyes were first upon his course, and have an unflinching faith in the future of his progress. His moral, social, and intellectual advance is to be wrought out through much toil, many labours, and bitter disappointments. But, nevertheless, all things are working for it. The signs and symptoms of success multiply around us. The standard of human excellence is constantly increased. The high-water mark of yesterday is the low-water mark of to-day. The level rises. *Festina lente.* Let who will say that the good work is slow; we answer that, at all events, it is sure.

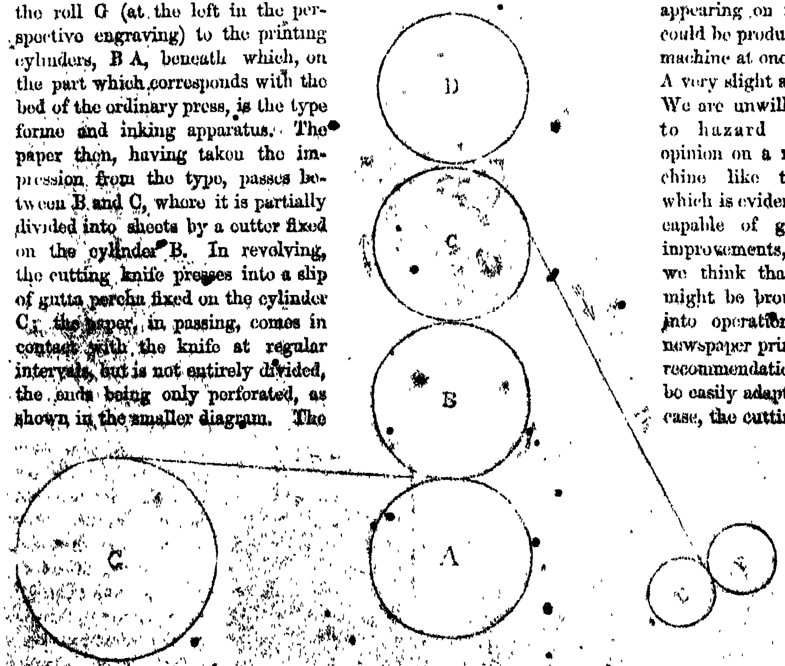
We have yet another word to say in connexion with our "Card." The Great Exhibition is bearing its fruits. The woodwork for the steam-thrashing machine of which we have been speaking, was executed by an ingenious mechanic of Althorpe, named Kelsey. He came up, with others last year, to see the show, and crowded a whole apprenticeship into the two days which he spent in the agricultural implement department, and then returned home again with, as they would say on the other side of the Atlantic, "a cargo of notions," which have inspired him for life. Doubtless, the same happy result has been produced in many other quarters. The Exhibition was a great schoolmaster, with many scholars. We love even to talk of such things. It delights us to be able, if we may so speak, to report progress of PROGRESS.

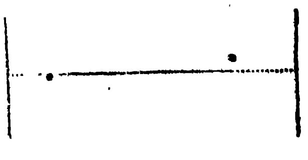
WORKING MODEL OF A NEW PRINTING MACHINE.



IN newspaper printing, as hitherto adopted by the great metropolitan establishments, the size of the broadsheet has been restricted by three very serious causes: the difficulty of making large sheets of paper; the still greater difficulty of providing machines adapted to print an extremely large sheet; and the present state of the law, which does not allow a newspaper to be printed on a sheet containing more than a certain number of square inches, without being charged with an extra stamp duty. The first of these difficulties has been successfully overcome, and paper can be made of almost any size; in fact, the Messrs. Spicer exhibited in the late Exhibition a sheet of paper 46 inches wide and 7,560 feet in length! The second difficulty has arisen from the fact of an extremely large sheet being somewhat unmanageable in the machine, in consequence of its having to be "laid on" and "taken off" by hand. These terms will be readily understood by those who have seen a sheet of paper printed. And so it has happened that, notwithstanding the legal impediment—which, it is expected, will soon be removed—and besides the improvements made in printing machines, it has hitherto been found impossible to work a much larger sheet than those at present in use. These difficulties are of course removable, and Mr. T. Nelson, of Edinburgh, has invented a machine, by which he promises to accomplish, by a simple process, that which has puzzled so many clever heads. In the engraving will be seen a perspective view of his working model of a machine for "printing paper from the web, and cutting it up, as soon as printed, into pieces of any required length" The machine "feeds" itself, no "layer on" or "taker off" being necessary; and, as paper can be made of an indefinite length, it follows that, if the workmanship be good, a great point has been gained in the way of cheap and expeditious printing.

We will endeavour to explain the *modus operandi* of this clever little model, which was shown in the late Exhibition, by the use of a pair of simple diagrams. The web of paper is first led from the roll G (at the left in the perspective engraving) to the printing cylinders, B A, beneath which, on the part which corresponds with the bed of the ordinary press, is the type forme and inking apparatus. The paper then, having taken the impression from the type, passes between B and C, where it is partially divided into sheets by a cutter fixed on the cylinder B. In revolving, the cutting knife presses into a slip of gutta percha fixed on the cylinder C; the paper, in passing, comes in contact with the knife at regular intervals, but is not entirely divided, the ends being only perforated, as shown in the smaller diagram. The web of paper is then led upwards to the second pair of printing cylinders, C D, where it is perfected—that is, printed on the other side. It then passes on to the flat band H, and is caught by the rollers E F. On these are affixed a pair of cutting knives, by which the complete separation of the paper into sheets is finally effected. A simple arrangement of screws enables the superintendent of the machine to adjust the cutting-knives to any required length of paper, and a board with raised sides receives the printed sheets, and arranges them into regular piles, ready for drying and warehousing. The machine can of course be driven by either hand or steam power; and we believe that the proprietors have worked one constructed on this principle at the rate of 5,000 sheets an hour. At this extreme speed there is, however, danger of the type "setting off"—that is, the impression from the yet undried sheet appearing on its neighbour. The same amount of work could be produced by passing two webs of paper through the machine at one time; each to be printed on one side only. A very slight alteration of the machine would effect this.





We are unwilling to hazard an opinion on a machine like this, which is evidently capable of great improvements, but we think that it might be brought into operation in newspaper printing with some degree of success. Its great recommendation is its simplicity. It is patented, and might be easily adapted to print cotton cloths. Of course, in this case, the cutting-knives would be dispensed with.

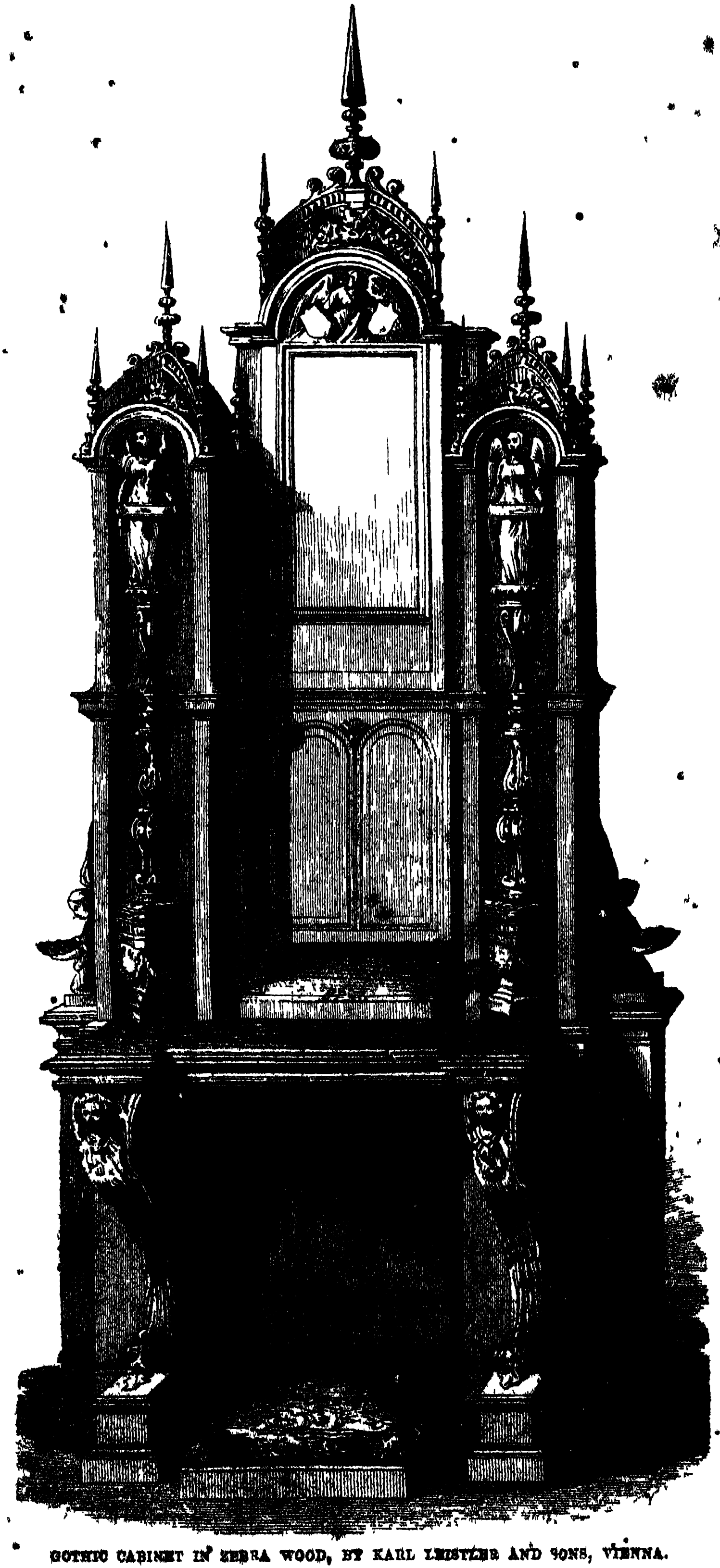
The great advances which have of late years been made in the education of the people, and the vast accession to the numbers of the "reading public," have caused a similar activity in the conductors of the public press. About 66 years ago the *Times* newspaper was a sheet not much larger than a single page of that paper now, with no leading article, and but half-a-dozen advertisements. The first steam-printing machine was used at the *Times* office. Everything has progressed with regard to printing. Well may the press be said to form a Fourth Estate, for its influence is more extensive and more powerful than that of any crowned monarch in the world.

THE INFLUENCE OF TASTE IN DOMESTIC APPLIANCES.

KARL LEISTLER'S AUSTRIAN FURNITURE.

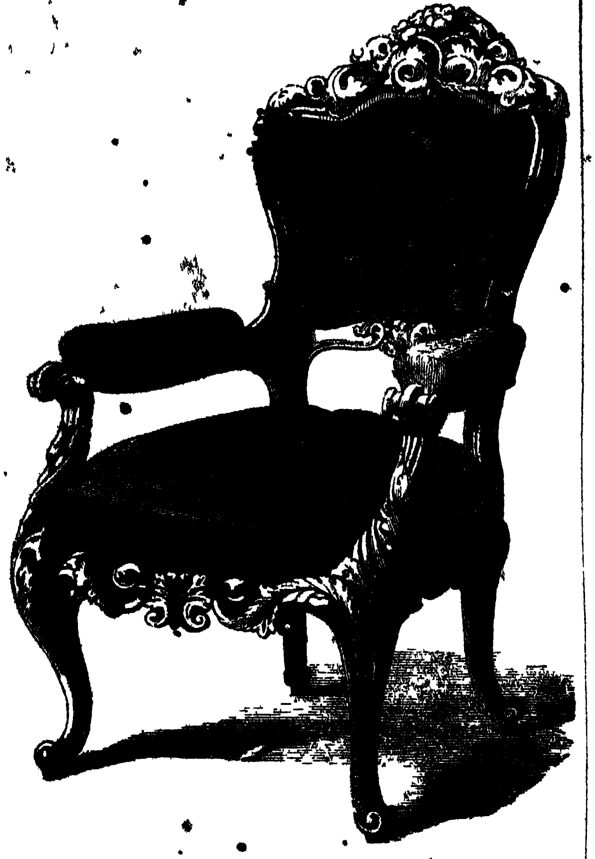
It is admitted on all hands that the cultivation of a correct taste in art is one important means of increasing the happiness and comfort of the people The Great Exhibition was, perhaps, a medium superior to any that the world had hitherto witnessed whereby the art-knowledge of various minds was brought into visible contact. There the productions of nations of which we had previously but a traditionary or book knowledge, were placed side by side with the more finished specimens of a higher class of artists, and an opportunity was given to manufacturers to study the works of stranger hands which may possibly never occur again.

It is not alone in the higher and more ambitious efforts of the artist that a taste for beautiful forms and chaste ornamentation is apparent In the humblest appliances of domestic life its manifestations are equally important A love of graceful forms and beautiful colours is inherent in mankind. We may trace it in the rude efforts of the untutored savage, no less than in the gorgeous magnificence which marked the revival of classical art in the beginning of the 13th century—a style we recognise by the French term, *renaissance* The visitor to the Crystal Palace may remember, amid the vast assemblage of objects presented to his gaze, some few which struck his fancy and impressed his mind by their grace of outline and fitness of purpose, while, on the other hand, he may have been pained to witness elaborate workmanship and profusion of ornament bestowed on others, which of themselves possessed little value—not value in the sense of money worth, but as regards their essential worth as evidences of high taste. Thus the man of judgment would see but little beauty in those highly-coloured and grotesquely patterned carpets hung from the girders, in which flowers and fruit luxuriated with *outré* animals and impossible geometrical combinations. In almost countless instances was this false taste exhibited. In one place it took the form of candelabra so overloaded with scroll-work and figures—young ladies bearing glass globes of light in their hands, delicate looking boys standing beneath loads of metal work which would have crushed an Atlas, and conglomerations of fruit, flowers, and parian—that the eye tired itself in attempting to convey an adequate idea to the mind. Again, this false taste crept slily into objects whose great size won for them a degree of unusual admiration and regard. In the Coalbrookdale Dome, for instance, the effect of John Bell's "Eagle Slayer" was lessened materially by the fact of the eagle itself appearing above, affixed to the roof, and with the arrow of the archer sticking in its heart. The poetry of the thing was taken away; there was nothing left to the imagination; and the spectator wondered that so piercing a look and so vigorous an arm was necessary to bring down the bird from so short a distance. In another place the correct eye was offended by the introduction of vivid colours in furniture and cabinet works: as, for instance, the picture so inappropriately introduced in Fourdinois' carved cabinet—that noble specimen

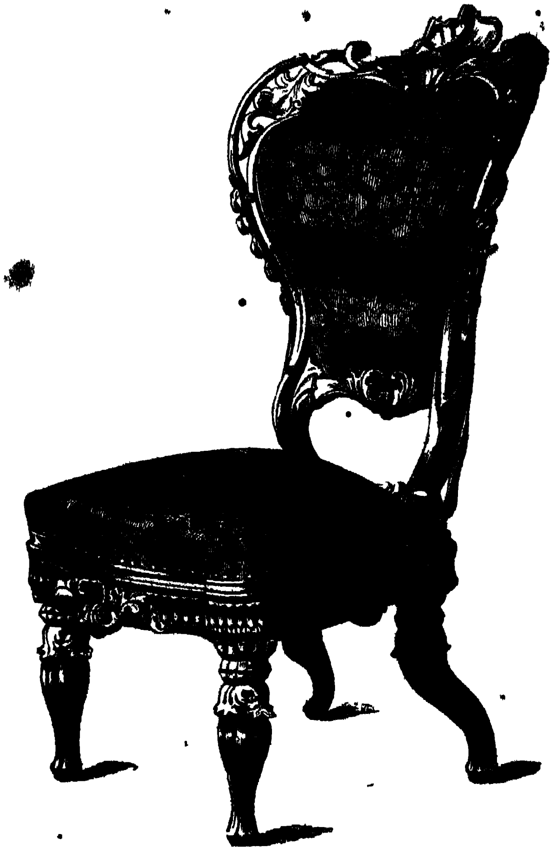


GOTHIC CABINET IN ZEBRA WOOD, BY KARL LEISTLER AND SONS, VIENNA.

of skill which stood outside the Gobelin and Sevrès room. The discriminating visitor could not fail to have remarked these and many other evidences of bad taste at the Great Exhibition; to say nothing of tables, chairs, pianos, and so forth, overloaded with buhl and metallic ornament; mirrors which were made to do service as toilet-tables, fire-grates in which the fire itself was the least important part, bronzes and flower-stands, centre-pieces and vases, porcelain and iron work, in which the superabundance of ornamentation—inappropriate, and therefore unnecessary,—were more particularly observable.



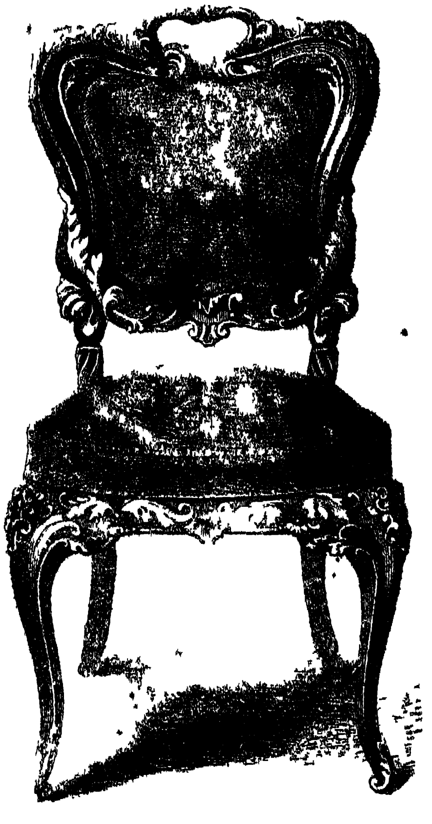
To return, however, to the main question. "Our taste, says Burke, "is improved exactly as we improve our judgment, by extending our knowledge, by a steady attention to our object, and by frequent exercise. They who have not taken these methods, if their taste decides quickly, it is always uncertainly; and their quickness is owing to their presumption and rashness, and not to any sudden irradiation." How true is this sentence none who have had the slightest experience in the arts, or have turned their reading to proper account, will for a moment question. The love of ornament is inherent, but the power of distinguishing the beautiful from the mere gaudy, the true from the false, the valuable from the meretricious, is only to be acquired by study and perseverance. No man is of himself a good judge of pictures or statuary, though all men can understand that which appeals to the understanding, the feelings, or the passions, through the medium of the eye. The love of ornament—or, rather, the taste for the beautiful is a necessity of our common nature, and if the universal want can be supplied with a due



LOCUST-TREE FURNITURE, FROM THE MANUFACTORY OF CARL LEISTLER AND SONS, VIENNA.

regard to commercial success, by so much are the providers in advance of those who contribute merely to the luxuries of the wealthy and refined. In the early history of manufactures, mechanical fitness is the first object sought, but as society advances, it is found that the mere uses of a particular article are not sufficient to satisfy the restless impulses of either designer or purchaser. There must be superadded to the first requisite, fitness for the purposes of life, a degree of elegance which attracts the eye and conveys a pleasing impression to the mind.

The ancients were well aware of this yearning after the beautiful, and they therefore decorated their cities with statuary and imposing buildings, and placed within their houses and their temples paintings and other objects likely to prove attractive from their specialities of form or treatment. A feeling in favour of the purer enjoyments of the senses once awakened must necessarily have required new stimulants. The appetite growing keener for this intellectual food, the inventive powers of the mind were more and more taxed to produce objects which should satisfy the requirements of the many; and hence arose those arts which in after ages became the pride and glory of the past. Confined to no people or spot of earth, the taste for the beautiful in form and colour permeates every corner of the habitable globe, and thus the visitor to the Exhibition found himself no less gratified in viewing the carvings of New Zealand, the paintings of the Eastern Archipelago, the necklaces and models of Tasmania, and the cloths and trinkets of India, than in gazing on the flowered silks of France, the bronzes and philosophical instruments of Germany, the tools and iron work of Belgium, the domestic appliances and photographs of the United States, or the statuary and furniture of Austria.



Of these last we present several specimens. Much has been said and written about the Austrian furniture of Carl Leistler and Son, and much may still be said both in praise and dispraise of the wonderful collection exhibited by them. One set of writers have spoken of their contributions as in every respect excellent and irreproachable—another have condemned them as outrageous in form, deficient in taste, and wanting in fitness. Some have gone into raptures when describing the "zebra wood dining-table for forty persons," while others have declared that the most [illegible] diners-out could find no place for their legs beneath it, on account of the multiplicity of its carvings and the elaboration of its ornament. The truth, it may be, lies between these extreme opinions.

As a whole, perhaps, no finer collection of ornamental cabinet work was ever brought together. A complete suite of rooms—a dining-room, drawing-room, boudoir, bedroom, and library—were furnished in the luxurious manner of the Austrian nobility; and a glimpse was thus given to untravelled Englishmen of the domestic habits of the highest classes in a great European empire. A portion of the furniture—the carved gothic bookcase and chairs *en suite*—were designed expressly for, and presented to, Her Majesty by the Emperor of Austria.

As specimens of first-rate workmanship the furniture of Leistler may be esteemed, as a whole, the best in the Crystal Palace, though exception might, in some instances, be taken to the designs of [illegible] Bernardis as being of too intricate and complicated a character. But it must be remembered, in answer to this last suggestion, that the chairs and tables were intended for the wealthiest to sit upon and at.

In the primary forms adopted by the designer, regard has been paid to the style of architecture of the rooms in which the objects were intended to be placed—the gothic or pointed and geometrical, and the *renaissance*, or a combination of all other styles, predominating. This left ample margin for elaborate ornamentation and characteristic detail, and so we find scroll and shell and flower repeated in a vast variety of pleasing forms.

Of the material of which the majority of these objects is constructed a word may be said in passing. In the vast empire of Austria exist immense forests which furnish large quantities of wood of almost every description. The commoner sorts are used for manufacturing purposes and fuel, while the finer kinds are set aside exclusively for the use of the cabinet-maker and carver. The beautiful brown zebra wood, of which the majority of Leistler's furniture is constructed, is capable of receiving a high degree of polish, and is considered as in no way inferior in appearance and wearing qualities to Spanish mahogany or rosewood, so much used [illegible]. The manufacture of ornamental furniture and inlaid floorings is carried on to a great extent in the cities of Vienna, Prague, Plass, Budweis, and in various parts of Hungary; and architectural carpentry forms a great and increasing means of employment to a large portion of the people. In the chief cities large manufacturing firms produce annually great quantities of furniture for home consumption and exportation, but in the mountain and valley districts, which occupy so large a portion of the surface of the Austrian empire, the making of domestic utensils and furniture constitutes the

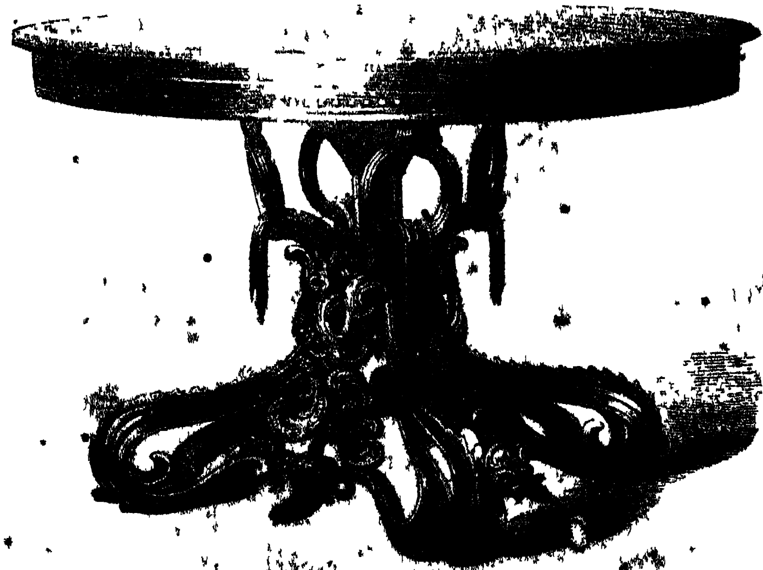


TABLE AND CHAIR IN ZEBRA WOOD.

chief employment of the villagers. The extent of this branch of industry may be seen by a reference to the export tables of Austria. From 1843 to 1847 the declared value of the exports of such common wooden articles as casks, shovels, rakes, wheel-barrows, and gardening tools, amounted to a yearly average of 308,000 florins.

In these, and various articles of luxury and utility exhibited in 1851, may be discovered a decided advance in taste and design. The mind of the 19th century is no longer satisfied with the crudities of mere fitness; it must have beauty superadded. If we would have the people to value and appreciate our social institutions, we must not neglect the minor appliances of life. The graceful outline of a piece of ordinary furniture, and the appropriate decoration of a cheap domestic utensil, must have a tendency to refine and civilise the minds of even the uneducated; and the more we study to make art-manufacture popular—the more we bring the elegances of life into the houses of the people—the more we endeavour to familiarise the public mind with the standards of excellence as they have descended to us from Egypt, and Rome, and Greece, and India—the more we develop the genius of our artists and the talent of our workmen, by so much the more do we increase the material comforts of the millions—by so much the more do we elevate their characters and enlarge their minds. We shall resume this subject.

THE LADIES' DEPARTMENT.

CROCHET COUNTERPANE FOR A BASSINET.

Materials.—Knitting cottons Nos. 10 and 12; 8 oz. of blue beads, rather larger than seed; crochet-hooks Nos. 17 and 18.

The centre of the counterpane is made in diamonds, with small pieces at the edges, merely to fill in the parts where the diamonds leave spaces, and form the whole into a solid square. It is done in ribbed crochet. Ribbed crochet is so called from the work having the appearance of ridges. It is worked backwards and forwards thus: the top of a row of crotchet, whether s.c., d.c., or t.c., presents an appearance of chain-stitch. In working ribbed crochet, take up always that side of the chain which is farthest from you. The middle of the counterpane is done in knitting cotton No. 10; crochet-hook No. 17.

For the Diamonds.—(A) Make 2 ch., miss 1, 3 s.c. in the first ch.

2nd row: Turn the work; 1 ch., 1 s.c. in one, 3 s.c. in next, 1 s.c. in third.

3rd row: Turn, 1 ch., 2 s.c. in second, 3 s.c. in next, 2 s.c. in two last.

Thus you proceed, turning the work at the end of every row, working 1 s.c. in every one but the middle stitch, in which you work 3, until you have made 15 ribs, and the row has 61 stitches, a chain-stitch being made at the beginning of every row.

Now make 3 ch., on turning, and work 3 d.c. in the first stitch, × miss 2, 3 d.c. in third, × 9 times, miss 1, 3 d.c. in second, 1 ch., miss 1 (which should be at the point), 3 d.c. in second, miss 1, 3 d.c. in second, * miss 2, 3 d.c. in third, * 9 times. This completes the row, the last 3 d.c. coming on the last stitch.

Turn, × 5 ch., d.c. between the sets of 3 d.c. of the last row, × to the end; s.c. only at the last.

Turn, × 3 ch., s.c. under loop, × to the end, but with 5 ch. at the point; another s.c. in the last loop.

Turn, 2 ch., d.c. in every stitch of last row.

Turn, 1 ch., s.c. in every stitch of last row; fasten off.

This completes one diamond, and for a bassinet quilt will be enough. A glance at the engraving will show how they are joined together.

For the half-diamonds at the side (B), make 2 ch.; work 2 s.c. in the first of these, turn, 1 ch., 1 s.c. in the first of the two of last row, 2 s.c. in the second; turn, 1 ch., 2 s.c. in the first, and 1 in each of the other 2 s.c. of last row. Continue working thus, making two in one at the end of one row and the beginning of the next, until there are 31 stitches and 15 ribs. Then, for the open part, 2 ch., turn, work 3 d.c. in the first stitch, × miss 2, 3 d.c. in next, × 10 times.

2nd row of open work: Turn, × 5 ch., d.c. under the chain between the first and second set of 3 d.c., × repeat to the end of the row; 5 ch., s.c. at the end.

3rd: Turn, × 3 ch., s.c. under loop, × repeat to the end.

4th: 2 ch., turn, d.c. in every stitch to the end.

5th: 1 ch., turn, s.c. to the end.

For the side pieces (C) work in exactly the same manner, only beginning by working thus: 2 ch., turn, 2 s.c. in the first of these, 1 ch., turn, 2 *s.c. in the first of the two and* 1 *in the second.* This is just the reverse of the other, the increase continuing to be made at that edge where the first increases. Of course the last row will end at the point of one piece, and the short side of the other.

(D) 2 ch., work 3 s.c. in the first of these, 1 ch., turn, 2 s.c. in the first, 3 in the next, 2 in the last. Turn, 1 ch.; work this and all the following rows until you have 61 stitches in this manner, 2 s.c. in the first and last stitches, 3 in one in the centre, and 1 in one in every other (increasing 4 stitches in every row). The five open work rows to be done as in A.

(E) Work these pieces like A, until 10 ribs are done; then turn and s.c. up to the three centre stitches, slip on the first of the three × turn, miss the slip stitch, slip on the next, and s.c. to the end; turn, 1 ch., s.c. on all the s.c. but the last, which slip; × repeat between the marks until one stitch only remains, through which the thread is drawn. The other side of the point must then be worked to correspond with the first, the centre stitch not being worked at all.

(F) These two morsels are begun like B and C, and finished in the same way that E is. They will then exactly fit those corners. The other corners (G) are worked by beginning, as usual, with 2 ch., in the first of which work 3 s.c., × ch., turn, 2 s.c. in first and last stitches, and one in each intermediate; ×, repeating backwards and forwards until 3 stitches are in the row, when complete by open work as in B and C.

The numbers required of each piece are—A 28. B and C, five of each. D, E, F, G, two each. (A glance at the engraving will show the manner in which these are joined into an oblong square).

Eyelet-hole Border.—When all are sewed together, a line of d.c. must be worked all round, with 3 stitches in one at the corners, and 2 in one on each side of the three. This will make the corners perfectly square.

2nd round. × 1 d.c., 1 ch., miss 1 ×; repeat all round, but not missing any at the corners.

3rd round (Eyelet-holes). These are to be worked quite separately from the last, at first. × 9 ch., close for a round in the second, and work 8 s.c. under the half, × repeat until a length is done sufficient to surround the square, every little round being half covered by the s.c. In covering the other half of each circle, you will attach it to the work thus:—4 more s.c. make the ch., slip the needle off the loop, insert it at the corner of second round, and draw the loop through, then 4 s.c. under the remainder of the circle, 1 s.c. on ch. between; × 4 s.c. under next eyelet-hole, miss 2 on the second round, insert the hook in the third, draw the loop through, and work 4 more under the ch.; × repeat, allowing 3 between, except at the corners.

4th round. S.c. (putting the hook under both sides of the chain) at the top of an eyelet-hole, × 5 ch., s.c. in the same way under the centre of the next, × all round, with 6 ch. at the corners.

5th round: × 1 d.c., 1 ch., miss 1, × all round, not missing any at the corners.

6th: S.c. all round, with 2 stitches in one at the corners.

Motto Borders.—For these use Goat's Head Cotton, No. 12, on which the beads must be strung before beginning to work. The borders are done entirely in s.c., the beads being dropped on, according to the pattern, *on the wrong side*, this *wrong* side being the *right* when beads are used in crochet. The ends have 241 chain each; the sides, 397. The pattern occupies 55 rows, and the squares at the corners have 55 chain, and the same number of rows.

The motto borders and corners are all worked separately, and afterwards sewed together. When completed, the eyelet-hole border is again added all round, and the counterpane then only requires a deep open border, which we will give next week.

This quilt would be very handsome, if worked in coarser cotton, for a full-sized bed. The small diamonds in the centre would thus be increased in size, and a sufficient number should be done to form a middle just three times the dimensions of that now given. The borders should be worked in open square crochet instead of s.c.; the pattern and letters in close squares on an open ground. It would, for this purpose, be requisite to make the chains of three times the number of stitches, and one over: or 724 for the ends, 1,192 for the sides, and 166 for the corners. In other respects the counterpane might be worked exactly from the instructions.

The family coat-of-arms and crest, correctly drawn, would make a very handsome centre for a counterpane in crochet. When a quilt is done in square crochet, it should be laid over one of the new patent wadded counterpanes of a colour appropriate to the furniture of the room, as this displays the work to great advantage.

DEEP BORDER FOR BASSINET QUILT.

MATERIALS.—Knitting-cotton, Nos. 10 and 16; and Crochet-hook, No. 18.

This lace is to be worked round the last eyelet-hole border.

1st round: S.c. round the edge of the last border, with two stitches in every one for two inches on each side of the corners.

2nd: × 1 d.c., 1 ch., miss 1 × all round, but not missing any at the corners.

3rd: Like first, but with 2 in 1 for three inches round the corners, at the extreme points of which there will be 3 in 1 three times.

4th: Begin at a corner. × 2 d.c., 1 ch., miss 1., 1 d.c., 1 ch., miss 1, 2 d.c., 9 ch., miss 2, × 4 times. Then continue along the side, missing 6 instead of 2, until you come to within 41 stitches of the next corner, when you will miss two only again, and at the point of the corner miss none. All the sides are to be worked alike.

5th: (Begin over the 2nd of the first 2 d.c.). + 2 d.c., 1 ch. (which comes over the 1 d.c.), 2 d.c., 5 ch., 1 d.c. on 5th of 9 ch., 5 ch. × all round.

6th: × 3 d.c. (the second coming over the 1 ch.), 5 ch., 3 d.c. (the second coming over 1 d.c.), 5 ch. × all round.

7th: × 1 d.c. (on the 2nd of the 3 d.c. you began with in last round), 5 ch., miss 4 ch., 2 d.c., 1 ch., miss 1 d.c., 2 d.c. 6 ch. × all round.

8th: (Begin on the last chain before the 2 d.c.) × 2 d.c., 1 ch., miss 1, 1 d.c. over 1 ch., 1 ch., miss 1, 2 d.c., 9 ch. × all round.

Repeat from the 5th to the 8th round, inclusive of both, thrice; then the 5th and 6th again. This will make 18 rounds.

19th: × 1 s.c. on centre of the three d.c. you began the last round with, 6 ch., 2 d.c., 1 ch. (over the middle of 3 d.c.), 2 d.c., 6 ch., × all round.

20th: × 1 s.c. over 1 s.c., 6 ch., 2 d.c., 1 ch., 1 d.c. (over 1 ch. of last round), 1 ch., 2 d.c., 6 ch., × all round.

21st: × 1 slip on s.c., 1 s.c. on 1st of 6 ch., 7 ch., 3 d.c. (the 1st over 2nd d.c. of last round), 1 ch. over 1 d.c., 3 d.c., 7 ch., s.c. on last of 6 ch., × all round.

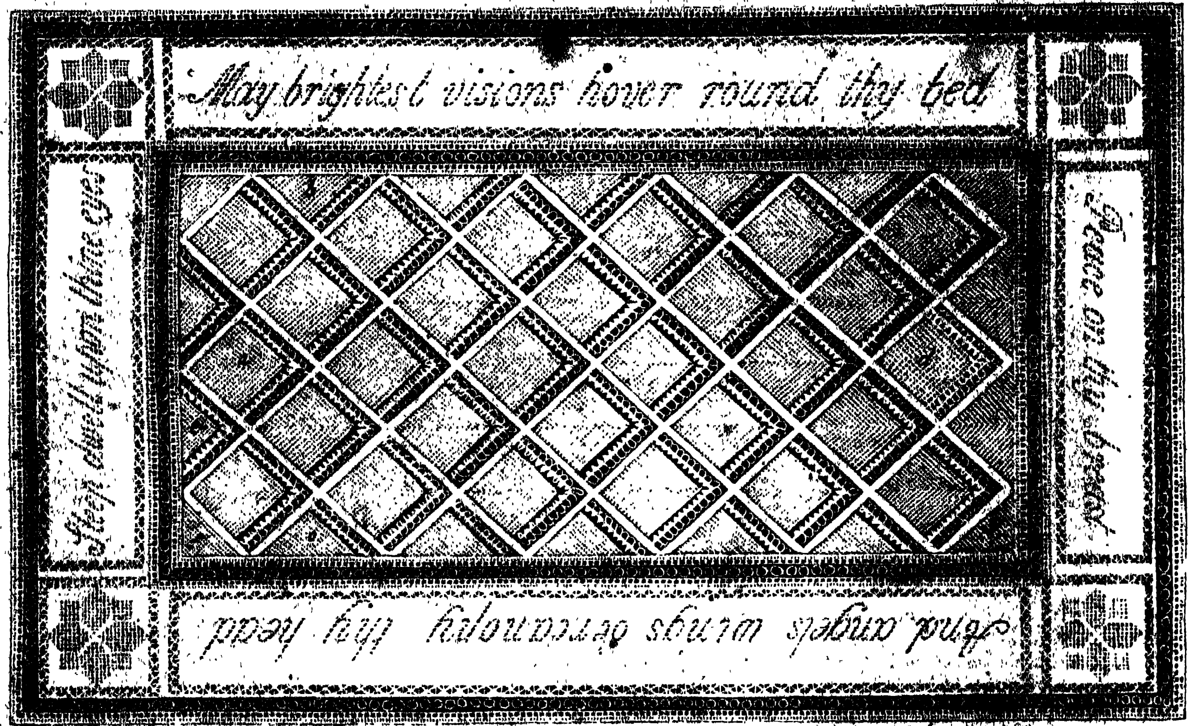
22nd: × s.c. on s.c., 4 ch., d.c. on 4th of 7 ch., 5 ch., 3 d.c. (the 2nd over 1 ch. of last round), 5 ch., 1 d.c. on 4th of 7 ch., 4 ch., s.c. on s.c., × all round.

23rd. × s.c. on s.c., 5 ch., 2 d.c. (the 1st over 1 d.c. of last round), 5 ch., 1 d.c. over centre of 3 d.c., 5 ch., 2 d.c. (the 2nd over 1 d.c.), 5 ch., s.c. on s.c., × all round.

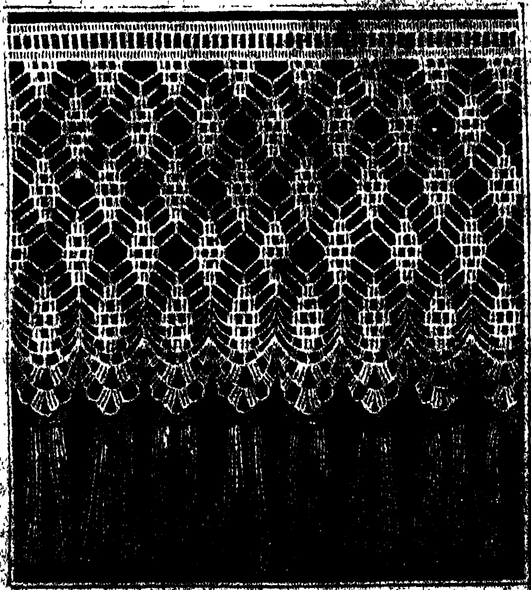
24th. × s.c. on s.c., 4 ch., 3 d.c. over 2 d.c., 3 ch., miss 2, 3 t.c. on 2 ch., 3 ch., miss 3 (that is, 1 d.c., and 1 ch. on each side of it), 3 t.c. on 2 ch., 3 ch., miss 2, 3 d.c. on 2 d.c., [illegible] s.c. on s.c., and × all round.

25th: S.c. on [illegible] 4 ch., miss none, 4 d.c., × [illegible] times, 4 ch., miss none, 4 s.c. on 4 chains, × all round.

This is the last round. The fringe is then put on thus: wind your cotton (No. 16) twelve times round a card about 2½ inches wide; slip it off, catch up the threads with a crochet-hook, and draw through one of the loops of 4 chain in the last round. When half-way through, pass the other ends through the loop, draw it up tightly, and cut the ends. Repeat this for every loop of 4 ch., and the fringe is complete.


May brightest visions hover round thy bed
Peace on thy breast
And angels wings overcanopy thy head
Sleep dwell upon thine eyes

CROCHET COUNTERPANE FOR A BASSINET.—(*See page* 127.)

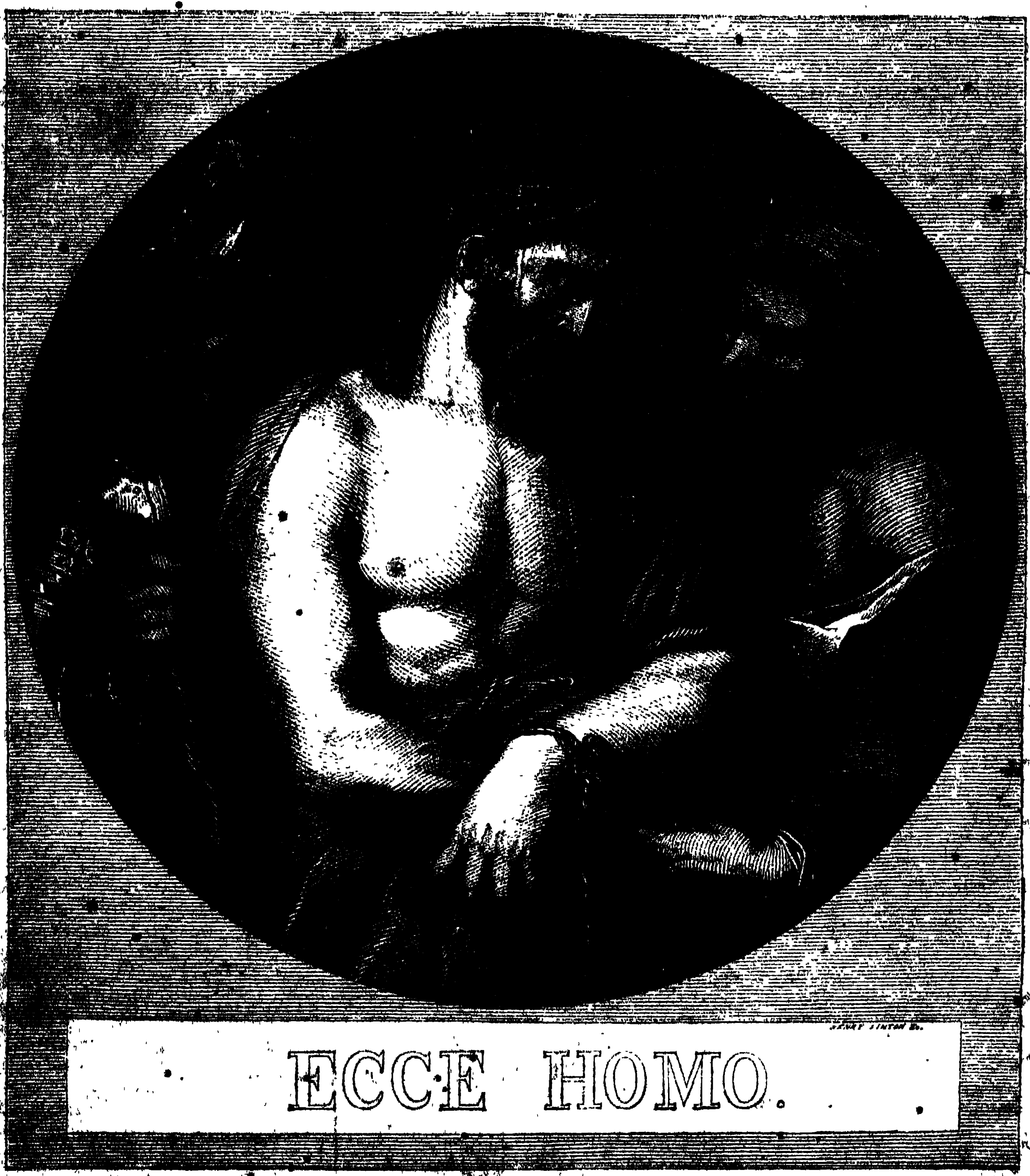


DEEP BORDER FOR BASSINET QUILT.

THE "ECCE HOMO" BY MURILLO.

Between religion and art there ever has been an intimate connexion. What the one teaches the other pourtrays. The human mind ever loves to realise whatever the annals of history may record; and that desire becomes higher the more sacred the history—the holier the theme. Thus few have read in the Gospel narrative of how Jesus came forth, wearing the crown of thorns and the purple robe, and how Pilate said unto the spectators around, "Behold the man!" without picturing the pallid face and bleeding brow of the Saviour who died for man a bitter death of agony and shame. To the Christian Church the subject has ever been dear. To art also it has been invested with peculiar interest. Painters have loved to impress it on the eye—poets and orators upon the heart.

The title of "Ecce Homo" (Behold the Man!) is given to such pictures as represent the Saviour crowned with thorns. Generally it is a single head, but sometimes other figures and accessories are introduced. Correggio's celebrated picture of that name consists of five half-length figures. As that picture adorns our own National Gallery, we need not describe it here. We may only say of it, in the language of Dr. Waagen, that "if it be one of the highest objects of art to purify by the beauty of the representation the most painful suffering, so that it should produce only a soothing and consolatory effect, Correggio has here attained that object in an astonishing degree." Amongst the other painters who have aspired to treat the same sad scene, a foremost place is due to Bartholomew E. Murillo.


HENRY LINTON Sc.
ECCE HOMO.

DRAWN BY ANELAY, AND ENGRAVED BY H. LINTON, FROM A PAINTING BY BARTOLOMEO E. MURILLO.

It will not be out of place here to give a few particulars of his life. Murillo, the greatest of all the Spanish painters, was born at Seville on the 1st of January, 1613. He began by painting *tableaux de genre*—fairs, rustic festivals, and beggars.

He received his first instructions from his relation, Juan del Castello; but the latter having gone to settle at Cadiz, Murillo was obliged, for the means of subsistence, to have recourse to painting banners and small pictures for exportation to America. In that line he obtained full employment, and began to distinguish himself as an able colourist. He was still very young, says Pilkington, when he happened to see some work of Pedro de Moya, who was passing through Seville on his way to Cadiz, which, being painted in the style of Vandyke, inspired him with the desire of imitating that great artist, under whom De Moya had studied, shortly before his decease. The time Murillo was able to avail himself of De Moya's instruction was very short, and he resolved afterwards to repair to Italy for improvement; but his means were totally inadequate to meet the expenses of such a journey. Collecting, however, all his resources, he bought a quantity of canvas, divided it into a number of squares, upon which he painted subjects of devotion and flowers, and with the produce of these set out upon his journey unknown to his relations. On his arrival at Madrid, he waited upon Velasquez, his countryman, and communicated his plans to him. Struck with the zeal and talents of the young artist, Velasquez treated him with the greatest kindness, and diverted him from his journey to Rome by procuring for him full employment at the Escurial and in the different palaces of Madrid. Murillo returned to Seville in 1645, after an absence of three years. The following year he finished painting the little cloister of St. Francis, in a manner that much amazed his countrymen. The picture of the death of Santa Clara, and of that of St. James distributing alms, served to crown his reputation. In the first he showed himself a colourist equal to Vandyke; in the second a rival of Velasquez. They obtained him a multitude of commissions, which were not long in procuring him an independent fortune. His success, however, never led him to be careless of his reputation. He gradually perfected his manner by giving more boldness to his pencil, and without abandoning that sweetness of colouring which distinguished him from all his rivals, increasing its strength, and giving greater freedom to his touch. Having been invited to Cadiz to paint the grand altar of the Capuchins, he there executed his celebrated picture of the Marriage of St. Katherine. He died in 1685, by a fall from a scaffold, on which he stood when engaged in that great work. Previous to 1801 his pictures were little known in England, and his best works not at all. The Peninsular war was the means of acquainting us better with Murillo, and the other masters of the Spanish school.

Of Murillo, Mrs. Jamieson, in her "Handbook of the Public Galleries of Art," says.—

"Though he ascended afterwards by mere force of native power and feeling to the highest religious and historical subjects, there is a tinct—I will not call it a *taint*—of his early studies running all through them. Still I cannot regret, with others, that he never visited Italy; there art was in its decline, and the best master then living was Pietro da Cortona. In his own country he had Velasquez for his master; the most select and beautiful pictures of Titian for his models; nature for his inspirer;—nature, free, harmonious, picturesque—the fervid nature of his own sunny climate—the mingling of the classic, the Gothic, the Moorish, in blood, aspect, and manners, which, if far removed from the ideal, was in the highest degree striking and expressive. The stamp of national character and organisation impressed on all Murillo's pictures, gives to his beggars and domestic subjects a beauty and value quite peculiar, while in his grand historical pictures it was directed by such an elevated feeling, and embellished by such a graceful suavity of execution, that it becomes a characteristic of the painter, blended with his individual excellencies, and which we cannot wish away. 'His colour is clear, tender, and harmonious; and, though it possesses the truth of Titian, and the sweetness of Vandyke, it has nothing of the servility of imitation. Though he often adopts a beautiful and elevated expression, there is a portrait-like simplicity in the airs of his heads, which perpetually recalls us to common nature. His style may be said to hold a middle rank between the unpolished naturalness of the Flemish, and the ideal grace and grandeur of the Italian school.'" Of all these characteristic qualities, his "Holy Family," in our own National Gallery, may be considered a fair specimen, and should be studied with attention.

We have said Murillo was among the first of the Spanish painters. A few words as to the Spanish School of Painting, consequently, will not be amiss. Allan Cunningham says the school of Spain has a roll of early artists and a list of paintings to produce of a respectable antiquity, but the former are without fame, and the latter without shape or soul. The fountain of her art is muddy; nor is the fuller stream perfectly pure and deep. Without referring to those who, in barbarous times, wrought in stone, and wood, or on parchment, or glass, or, when religion gave light to painting, produced the first Babes, and Virgins, and Saints, we may briefly say that Antonio del Rincon is allowed to be the earliest who vindicated, by his productions, the genius of his country.

He was born at Guadalaxara, in 1461; caught a love of art from the old mechanical workmen of Spain; carried his desire to excel to Rome, where he studied under competent masters; and, returning home, was honoured by the appointment of painter to the magnificent Ferdinand and Isabella. His works are of the kind called historic: he embodied the legends of the church, nor did he hesitate to employ the portraits of the living to represent the dead or the forgotten. Time and accident have wasted his productions those which he expected to carry his name to future ages, perished when the palace of the Prado was burnt: they had a shade of the Moorish character in them. Blas de Prado carried the art a step farther towards excellence: his Descent from the Cross shows talents akin, it is said, to those of Parmegiano. He was also skilful in portraiture, and painted in Barbary the daughter of the Emperor of Morocco, for which he was highly rewarded. The next painter drew his inspiration from another source; this was Fernando Gallegos, born at Salamanca in 1500, and who became the scholar of Albert Durer; he followed this German master with a success which procured him the patronage of the Emperor Charles V. There is a touch of the gothic in all his works. But Pedro Campana drank at a purer fountain; he went to Rome, and studied Raphael, and is now named with those who give as much honour as they draw from the Roman school. He painted the triumphal arch at Bologna for the reception of Charles V., and in Seville executed his famous picture of the Nativity and Purification he also painted a Descent from the Cross. These artists seem to have trod carefully, as far as their choice of subjects enables us to judge, in the footsteps of others.

The next we come to was Louis Morales, the pupil of Pedro Campana, called, on account of the subjects which he painted, *El Divino Morales*, but as others, with more truth, assert, because of the air of heaven shed over his performances. In sweetness and expression he has been likened to Da Vinci. He died in 1556. The pictures of Pedro de Marmolija are distinguished by a grandeur and sublimity rare in the Spanish school. Gaspar Becerra, born in Andalusia, in 1520, having studied under Michael Angelo, aided in freeing Spanish art from much of its barbarism, by introducing a happier taste and more scientific style. But we hasten to the time of Velasquez, who stands out as a bright, particular star. Velasquez came of an ancient race, and was born at Seville, in 1594. He studied under Francesco Herrera, a rigid master, but of great ability. He forsook the scriptural track and legendary highway to fame in painting, and selected subjects from nature, which at first he treated in the manner of Caravaggio; but, on seeing more graceful models, he changed his style, and sought to unite that of Guido to the manner of Luis Tristan, whose happiest works he called the best of all works. One of his earliest pictures—a work of wonderful nature and expression—represents an old Aguador in a tattered cloak, giving a drink of water to a boy; the figures were portraits; this, or some other of his productions, attracted the notice of the Prime Minister. Olivarez, who invited him to his house, sat himself, and persuaded the King to sit for his portrait also. The Prime Minister praised this performance, and all the court applauded it. And it merited their applause. The King is in rich armour, and on horseback, with that serene and almost melancholy loftiness of look which distinguishes most of the portraits of this ancient master. He studied the history of his country, and in his picture of the Expulsion of the Moors, where he entered the list against three rivals, succeeded so completely, that Philip increased his pension. To prepare him for other efforts, he was sent by the King to Rome: his studies limited to eighteen months, were visible in his picture of Jacob recognising the Coat of Joseph, as well as in the Infidelity of Venus, and the Crucifixion—a work sufficient of itself for immortality. He was the friend of Rubens, who felt his genius; and though he continued the friend of Olivarez after his disgrace, the King, so far from resenting it, rather loved him the more for it, and continued to heap commissions on him, and dealt out with a liberal hand both gold and commendation. He died suddenly of a fever, in the blaze of his fame.

After Velasquez comes Murillo, and then we meet with no names worthy of record. The list of painters belonging to the Spanish school generally concludes with the name of Claudio Coello, painter to Philip IV. We might give many more names, but it is unnecessary to do so. To the whole school one character pertains. Their painting was chiefly of a religious character. They sought few subjects for the pencil in either the poetry or the history of their country. Occasionally, but very rarely, they indulged in landscape or portraiture, but the staple commodity was of a devotional kind. Their favourite subjects were processions of holy men—miracles of traditional saints—legends, real or imaginary—and when these fruitful sources failed, the history of Christ and the acts of the apostles. Though not aiming at much originality, the Spanish school will live while art is loved—live for ever in the natural ease and colouring of Murillo, or in Velasquez's gloomier grace.

VENICE.

Attila, the "Scourge of God," was in the habit of boasting, that the grass never grew where his horse had once trod; but it must for ever remain a striking monument of the vanity of earthly wisdom, and the weakness of human valour, that the ferocious conqueror of the Western Empire should have laid the foundation of one of the mightiest states of modern Europe; and that the fierce bands, who gave form and consistency to feudalism, should also have provided a nursing mother for commerce and art.

The province of *Venetia*, or *Henetia*, included, in ancient times, a large fertile tract of Italy, and was the seat of many flourishing and populous towns. Two of them, Aquileia and Padua, were the chosen residence of opulent knights and senators, and were renowned for the vast extent of their agricultural and manufacturing industry. But when the barbarians for the first time entered Italy, and effaced whatever traces yet remained of the prestige of ancient power, this fertile garden was turned into a howling wilderness. Attila overran the whole country, sacking the towns and slaughtering the inhabitants. Those of the population who, bereft of property and liberty, were still left in the enjoyment of a precarious and degraded existence, looked around for some refuge in which they might dwell, it might be in hardship, or perhaps in want, but at least in security. Within half an hour's sail of their coast, a hundred muddy islands rose feebly from the sluggish waters of the Adriatic. These sand-banks—for they were little else—were the deposits carried down, during the course of many centuries, by the thirty rivers which discharge their waters into this part of the gulf. The narrow channels which separated them could only be navigated by skilful and experienced pilots, and were a sure defence against the approach of a foreign invader. To these the terrified Venetians fled in crowds from the mainland; and here, for many a year, noble families, who had been accustomed to revel in luxury, were content to earn a scanty subsistence by fishing, and the extraction of salt from the waters of the sea. Cassiodorus compares them to water-fowl which had fixed their nests on the bosom of the waves, and expresses his earnest sympathy with their poverty and misfortune. Nothing tends so much to the growth and formation of energy and determination of character as a struggle against adverse circumstances and unpropitious fortune. Devotion and heroism, which slumber in the lap of prosperity, spring into life and action when prosperity has deserted us and fled. The first efforts of the Venetians were directed towards the supply of the necessaries of a coarse and hard existence; but when the continued exercise of self-reliance had proved more than sufficient to satisfy these demands, the desire for wealth and its concomitant power rapidly succeeded. The far-famed Rialto[*]—a sort of port to Padua—was already in existence, and other buildings began to spring up. Ships were built, and commerce and navigation extended. The foundation of some of the principal buildings was laid on the 25th of March, early in the fifth century; "the day," says the old historian, "on which Christ was conceived in the womb of the Virgin, and Adam, the parent of mankind, was formed by God." The neighbouring sands were soon peopled by other fugitives, and, with a feeling of devout thankfulness for the refuge they had found, the townsmen of Altino gave to their adopted asylum the name of the "Port of the Deserted City."

The growth of their commerce, and the increase of their population, obliged the Venetians to establish forthwith some form of government adapted to their habits and situation. Each fresh outrage on the continent was adding to their numbers, and each fugitive, smarting under his wrongs and spoliation, was eager to adopt whatever system afforded him the best prospect of personal liberty and security for his property. Each of the islands elected a tribune, who exercised the office of a judge during one year only, and had to answer to a general assembly of the whole republic for the manner in which he discharged his duties.

The invasion of the Lombards drove more of the inhabitants from the mainland, and with the increase of strength came the demand for increased energy and centralisation in the government. A general assembly was therefore convoked at Heraclea, and it was determined to entrust to a single magistrate, to be called, in the corrupted Latin of the day, a *doge*, or dux, or duke, the power which had hitherto been divided amongst several tribunes. Twelve electors, the heads of the proudest families of the Venetian aristocracy, united their suffrages in favour of Paola Luca Anafesto, a citizen of Heraclea. The dignity was conferred for life. He was assisted by a Council of State, the members of which were nominated by himself. He had complete control over the public revenues. He appointed judges and tribunes, and summoned all ecclesiastical synods. All appeals from inferior courts lay to him, and he alone could declare war and make peace; in short, he was almost absolute. But frequent abuses of power by his successors, the jealousy of the nobles, and turbulence of the populace, brought about a series of revolutions, which at last reduced the doge to a puppet, and annihilated the liberties of the people. A haughty aristocracy seized the reins of power, and exercised the powers of Government, either under the varied titles of Councils of Five Hundred, or Ten, or smaller numbers. But the Republic, nevertheless, continued to thrive and flourish. It soon was able to defy the power of the mightiest monarchs of the European Continent. Charlemagne claimed no sovereignty over it, and when his son Pepin attempted to subdue it, he was ignominiously defeated. His lofty war-ships were stranded in the narrow channels, or *lagunas*, which surrounded the islands, and burnt amidst the contemptuous laughter of the Venetians, whilst his cavalry perished helplessly in the attempt to swim across. Placed on the confines of the Greek and Latin Empires, the islanders acknowledged the sovereignty of neither, and in their religious creed professed equal independence of the pope of Rome and the patriarch of Constantinople. The sea was the element by which they triumphed and grew rich. They were the carriers to Europe of all the wealth of the East, and monopolised the commerce of the Mediterranean. To the crusaders they furnished gallies and money. Their bank was the first that was ever established, and was the source to which all the Kings of Europe applied for assistance in their necessity. Their splendid palaces, gorgeous senate-house, magnificent churches, and capacious arsenal, were the admiration of all the world. From their harbour a hundred gallies, fully manned and armed, could issue, to protect their commerce, or assert the honour of their flag. The Greeks, the Turks, and the Normans, were alike worsted in all their attempts against the liberty and independence of the "Bride of the Sea."

We cannot, in our limited space, attempt to follow the Venetian Republic through all the revolutions, battles, sieges, and fortunes of her chequered and romantic history, but we cordially hope that our brief and meagre sketch may be the means of exciting the curiosity of our readers, and inducing them to seek in larger works the wondrous story of this ill-fated state. The wildest romances and the darkest tragedies have had their scenes laid in the City of the Waters. Her cavaliers were reputed the wealthiest, the most luxurious, and the most refined in the world. Her ladies were the gayest, the softest, and the most voluptuous. Many are the bewitching strains which are said to have been sung in the stillness of the soft Italian nights, in the lightly-bounding gondolas, by enamoured swains, under the windows of their mistresses' chambers.

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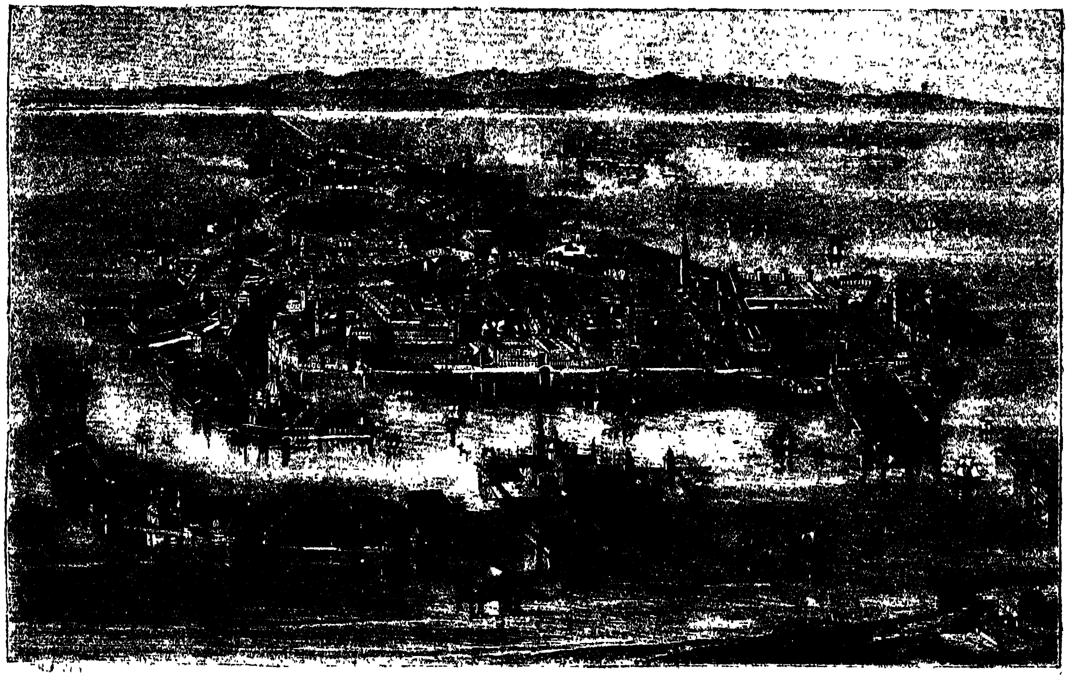
[*] *Rivo alto*—the deep stream—abbreviated into *Rialto*, is a name applied to three different places:—the island, *Isola di Rialto*; the bridge, *Il Ponte di Rialto*; and the Exchange, *the Rialto* of Shakspere, which stands upon the island.

Byron has immortalised one of the darkest scenes in Venetian history; and when the traveller, at the present day, sees the empty frame which *should* contain the portrait of Marino Faliero, veiled in crape, and reads the inscription underneath, which tells of his crime and its punishment, his thoughts naturally recur to the past glories of the Republic, when her laws triumphed over the treason of the first magistrate in the state; but while he remembers her greatness with awe and admiration, he cannot help shuddering at the crimes committed in her name. "The Bridge of Sighs"—across which the many victims of oppression, conspiracy, and cruelty, passed from an unjust judgment to a lonely and terrible death—stands still, a sad memorial of the vices and enormities of an unbridled oligarchy.



VENICE.

When the passage to the East, around the Cape of Good Hope, was discovered, the commerce of Venice began to decline; and her history since then is little else than a series of misfortunes. Her glory has now utterly departed. The terrible genius of Napoleon proved more than a match for the advantages of her position. When Italy fell before French arms, Venice fell also. At the peace of Vienna, the congress of crowned robbers, in dividing the spoil, placed her amongst the states allotted to Austria; and she has ever since groaned under the iron yoke of despotism. Her vain attempt at revolution in 1848 met with a terrible retribution. Her wealth, her commerce, her genius, have languished and died in the arms of absolutism. The spacious quays and deep canals are still there, but no vessels crowd the harbour, and there is no hum of busy traffic on the wharf. The gentle Adriatic, to which every year the Doge wedded the city with a golden ring, still washes the walls of the lordly palaces with its soothing and voluptuous murmur, but there is no longer the gay response of revelry from within. The nobles are banished, impoverished, or enslaved; the people are silent before the cannon and bayonets of the Austrian soldier; and little of Venice remains but the imperishable monuments of her art; and even her vices have lost the grace and charm which often palliated, and sometimes even dignified, them.

No description that we could give would furnish an idea half so clear of the position and general appearance of the city as our engraving. But there are still many things which the artist can never depict—the clearness of the atmosphere, the deep blue of the sky, the golden light reflected from the water, and the gorgeous colours of the public buildings.

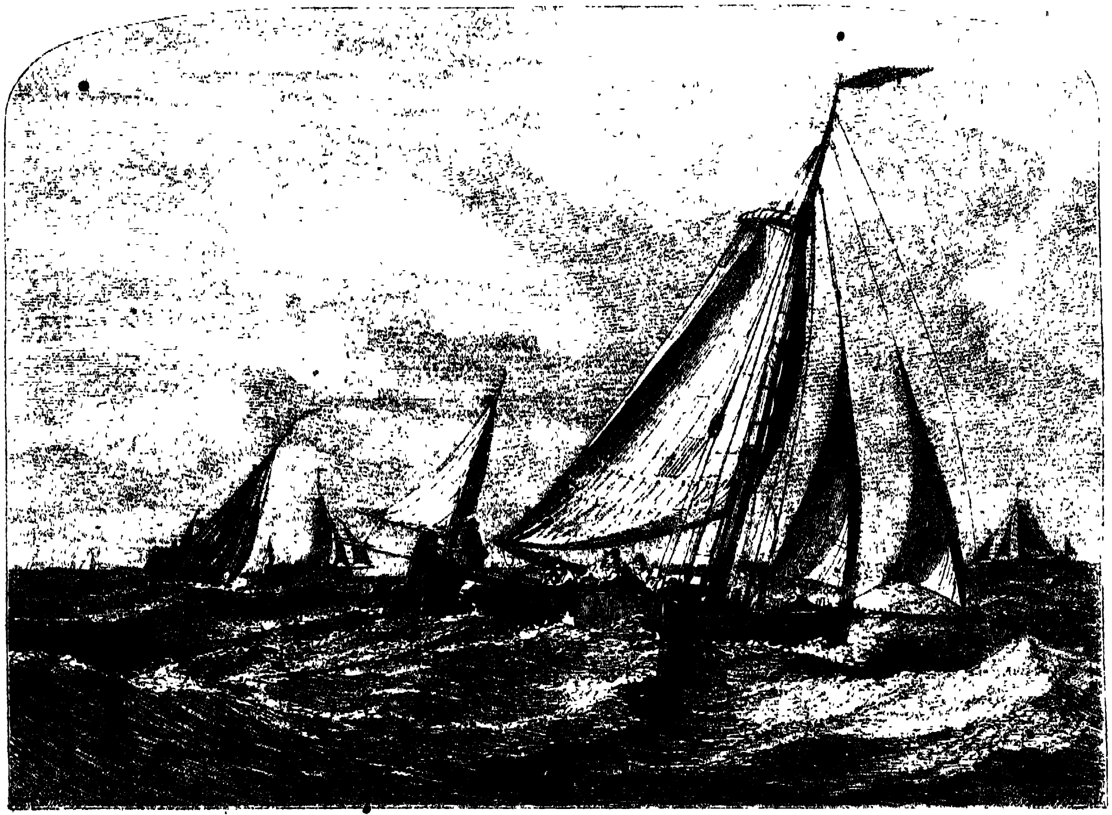
Venice is composed of one hundred and twenty islands of various sizes, connected with one another by one hundred and eight bridges, almost all of stone. The grand canal divides it into two unequal parts; that to the west is called *di quá dell' acqua*, and the other, which is much larger, is *di lá dell' acqua*. In following the course of this canal, the reader may remark that it is crossed by but one bridge, the Rialto; but at certain parts gondolas are constantly ready to ferry passengers over at a trifling charge. Except by the wealthier classes, however, and for pleasure on moonlight nights, the gondolas are not much used by the inhabitants, as it is quite easy to pass from one part of the town to the other by means of the bridges and narrow streets. The small patch of land at the bottom of the engraving, to the right of the reader, is part of the island of Santa Maria della Grazia. To the left, towards the west, is the narrow island, long and semicircular, *Giudecca*; so called from the circumstance that the first Jews who settled at Venice established themselves here; and in it, we may reasonably presume, Shylock counted over his "monies and his usances." It is also sometimes called *Spina Longa*, or the Long Thorn.

The public buildings of Venice are too numerous to be even named in the limits of our space, but they are all distinctly marked in our engraving. The white line on this side the island of St. Giorgio Maggiore, marks the position of the Slavonic Quay; there also are the Piazetta and its two colonnades; the palace of the Doge, behind which may be seen the dome of the church of St. Mark, and the Bridge of Sighs, &c., &c. Beyond the city a line may be distinguished indicating the position of the railway, which unites the town with the mainland. To the right are the islands of Cristoforo, and San Michael, the two cemeteries of Venice; Marano, in which the manufactures of glass and crystals were carried on; San Cyprian, San Chiara, San Matia, San Giacomo, Marzorbo, Tornello, Burano, &c.

THE DOGGERBANK.

The appendix to the Report of the Commissioners of Inquiry into the state of the Irish Fisheries, which was laid before Parliament in 1836, contains an historical sketch of the progress of the British and Irish Fisheries, from which we glean a few brief particulars, which may be not uninteresting or uninstructive to our readers.

So early as the ninth century the herring-fishery was extensively pursued along the Scotch coast, and continued to be a source of great profit to the natives until the Convention of the Royal Burghs, which prohibited the exportation of any fish before the resident population of the country had been supplied at a stipulated price. In consequence of this interference, many of the fishermen passed over into Holland, and laid the foundation of the competition in this branch of maritime industry which has since so largely prevailed between the Dutch and English. By James III. of Scotland, and the subsequent sovereigns of that occasion the miserable capital employed was exhausted in the purchase and fitting-out of a few busses, built in Holland, and manned with Dutchmen, which were seized by the French on the breaking out of the war. In 1713, it was proposed to raise £180,000, on annuities, for the purpose of establishing a fishing company; but the project met with little encouragement. Two further efforts, made in 1720 and 1750, were alike unsuccessful. For these failures two reasons have been assigned—the rule which made London the head-quarters of the fishery, it being the dearest port in the kingdom, and the great superiority of the Dutch in the art. In 1749, by the recommendation of George II., in his opening speech to Parliament, a Committee of the House of Commons was appointed to inquire into the state of the herring and white fisheries, and, as the result of its labours, a corporation was formed, with a capital of £500,000, under the name of "The Society of the Free British Fishery," of which



FISHING VESSELS ON THE DOGGERBANK. DRAWN BY DUNCAN. ENGRAVED BY H. LINTON

nation, several enactments were passed for the promotion of the fisheries; and James VI., before his accession to the English throne, directed the building of three towns for the same purpose; but this measure failed of success. Again, in 1632, a royal fishing company was established by Charles I., under the title of "An Association of the Three Kingdoms for a General Fishery within the said Seas and Coasts of His Majesty's said Kingdom." For the encouragement of this adventure, the importation of foreign fish was prohibited; a supply was ordered for the navy, and the strict observance of Lent was enjoined. The breaking out of the civil war, however, shortly afterwards, put an end to this scheme. In 1660, Parliament granted a remission of the Salt Duties, as a further encouragement to the fisheries, and freed all materials employed in the taking or curing of the fish from Customs and Excise. A few years later these measures of "protection" were followed by others which allowed the free importation of all commodities imported in return for fish supplied to foreign countries. Charles II., on his restoration, appointed, in 1667, "The Company of the Royal Fishery of England;" but on this the Prince of Wales was chosen governor. This society, though patronised by men of the first rank in the kingdom, and supported by a bounty of 56s. per ton to the vessels employed, soon began to languish, and in a few years proved a total failure. The attention of Parliament was again called to this great national object in 1786, when a new corporation was formed, under the name of "The British Society for Extending the Fisheries and Improving the Sea-Coasts of the Kingdom," which has continued, with various modifications, to the present time. Another Act was passed in 1806, which prescribed regulations for fishing, curing, inspecting, and branding herrings; and a board of seven commissioners, separate and distinct from the Customs and Excise, was appointed for administering the law. In 1830, the system of bounty, which had proved rather an injury than a healthful stimulus to the fisheries, was abolished; and since then the average number of barrels of herrings cured and exported has steadily and largely increased. The fishermen, deprived of extraneous aid, have been thrown upon their own exertions, and the increase of their prosperity has kept pace with their augmented industry. The British home fisheries include cod, ling, hake, herring, lobsters, mackerel, oysters, pilchards, and salmon; but of these the herring and cod form by much the largest proportion in the quantity taken. The principal stations for the herring fishery are off the Shetland and Western Isles, and off the Coast of Norfolk, in which the Dutch also share. The two seasons for this fishery are—the first, from June to the end of August; and the second, in autumn.

As a set-off to these historical details of the British fisheries, we shall conclude this paper with an old sailor's account of his "first and last" fishing experience on the Doggerbank. This extensive sand-bank lies between the East Coast of England and the West Coast of Holland, and forms the chief cod-fishing ground for the English and Dutch. It is further famous for a sanguinary, but indecisive, battle which was fought between the English, under Admiral Parker, and the Dutch, under Admiral Zoutman, in 1781. What follows, we give in the old sailor's own words, addressed to his son, whom he had named after the fishing-ground.—

"Yes, Doggerbank, I'll tell you this very day why you bear this name. It will not displease you when you know that it reminds me of my first and last fishing. It was on that sand-bank, the Doggerbank, that I begun and ended my life as a fisherman. I belong to Yarmouth, and so did my father and grandfather, and I am proud of it. I have not acted as my father did—I left the occupation; but you, my boy, must do as he did—do you understand? To those who try to persuade you to become a sailor, an officer, or what not—who advise you to seek your fortune as your father did—you must reply—'I won't go farther north than Fair Island, nor farther south than the Yare. I'll not leave the North Sea. The Doggerbank has given me its name, it is my godfather; it will support me, and I'll not forsake the fleets which cover it.'

"I was less than you, and not more than seven years old, in the spring of 1773, when my father said to me, 'James, you must come to the great fishery.' It is now forty-five years since then, and I have not forgotten how my heart leaped as I heard him say this. All the fishermen were assembled round the boats on the shore, drying the nets, mending the barrels, and putting on board heaps of Spanish salt. As for me, I believed that I had become a man at one leap. At one moment I was amongst the pots in which the oak-bark was boiling, at another I was helping to raise the nets and plunge them into the brown jelly to make them tough and strong. I was in everybody's way, and under everybody's feet, and got plenty of kicks and blows. At length everything was ready, the sails were spread, and every man was at his post. With loud hurrahs we set sail, and so well did I perform my part in this concert of shouting, that my father's second in command threw a bucket-full of water over me, as a reward for my noise.

"The general rendezvous was Fair Island, between Shetland and the Orkneys, and our herring-buss, being a good sailer, was seen amongst the foremost of the fleet. Towards the evening my father told us that we were over the Doggerbank, in five fathoms of water. Just then I began to perceive, at some distance, a long luminous line, and rubbed my eyes to make out what it was. At first the sea appeared quite black, but its waves became suddenly illuminated. 'There go the herrings!' cried the man on the look-out, and I became wild with excitement. The close column of fish which was swimming before us seemed likely to cross our course, and those of the men who were not occupied with the management of the boats appeared fascinated by the living billow, whose shining scales glittered brightly upon the sombre sea. No one paid any attention to me.

"I went forward to avoid the risk of falling overboard, and threw into the living waters a hood given me by my mother to shroud me from the cold, and which I had secretly fastened to a hook. I drew it up heavily, almost losing my breath in the effort; and as I went aft towards the binnacle light, I had not eyes enough to admire, in the midst of the small fry which fell frisking on the benches about me, an enormous herring, with a silver-coloured belly and a bright green back, such as those which the Dutch call *groen harings*, and which, on their arrival in June, cure all maladies. As I was admiringly contemplating my splendid prize, my father's boatswain launched forth upon me in a torrent of abuse.

"'You cursed brat!' roared he, 'you have done for us! You have taken the king of the herrings.'

"My father speedily snatched the hood from my hands, and threw both it and the fish back into the sea.

"'It's no good to do that,' remarked the boatswain, who cordially hated me. 'A herring once out of the water is as good as a herring dead. That one will never revive, nor ever again lead his army in spring. Our fishing now is not worth a fig.'

"From that moment I received nothing but cuffs and ill-treatment from the whole crew. Nevertheless, the fish that year proved more abundant than had ever been known within the memory of man. They were sold at the rate of thirty-four dozen for a penny, and were even given away for nothing to those who chose to accept them. For a time our own success was equal to any of the others. On our twelfth voyage, always to the Doggerbank, our overcharged nets broke with the weight of the fish; and, as if to complete the misfortune, a Dutch dog-boat ran into us on our starboard quarter, and we were forced to leave the fishing-ground, and return to Yarmouth to repair the damage. Whilst we were thus absent our neighbours enriched themselves by almost miraculous takes of fish, and I was pointed at as the source and author of all our misfortune. The next year I entered as cabin-boy on board a privateer; but throughout the whole course of my roving life I regretted that I had left my place in the fishing-boat and at the hearth of my father. I had adventures enough, but none of the homely comforts and joys which I had abandoned for the wild life of a rover. God sends the fish as he sends the corn, the water, the light, and the air, without restriction or limit. Be a fisherman, then, my boy; and when they try to persuade you to push your fortune abroad, say, 'No; I'll be a fisherman, as my grandfather was, and thus bring joy and plenty to my home.' To-morrow your uncle's smack sails for the Doggerbank—you shall go with him; but be not the first to throw out a net, lest, like me, you should catch the king of the herrings, and thus bring misfortune and failure upon the rest."

VIEW NEAR HAMPSTEAD.

A WALK in the country; a ramble in the woods; a holiday in the fields! With one or other of these phrases some of the dearest recollections of our life are connected. We remember the time when a regular good idle day was an event in our existence, when to get up early—so early that the streets looked sleepy, and the sky above our head was as yet free from smoke—and wander out into the country, was one of the greatest pleasures we knew. It is very different now. Cares and responsibilities rise up all around us, and the customs of the world, and the proprieties of life hem us in, as it were, with an invisible network, from which there is no escaping. Cares, responsibilities—well, what of them—though we should have shrunk at one time from encountering a tithe of them, they are pleasures now. Home, wife, children, friends, make the man think very differently from the boy. It is better that it should be so: the prattle of infant voices *may* drive away the romance of youth, but how many chastened joys come with it!

"A regular good idle day." Many people would think that a very objectionable phrase; as what possible good can come out of idleness? Oh, most industrious friend, most hard of taskmasters, most conscientious of workmen, remember old Æsop's fable—if the bow be always bent, it must either lose its tension or snap at last. And so, away from stool and desk, and books and figures in long grim rows, and out of the wilderness of bricks and mortar, we have wandered, many a time, to enjoy an idle day in the country.

Three miles or so, and we are there. And now, once for all, we protest against London being called a dull place for a thoughtful man. If any so incline—that is, if any take the trouble to acquaint himself with the past of our great city—he may people the streets with recollections of its former inhabitants—the greatest men in the world, some of them—and hang romances about the dullest-looking houses, and the most-out-of-the-way nooks and corners. And then as to the country around it. Why, just take the map, and carry your finger outwards from the city for half-a-dozen miles in almost any direction, and you will find green fields in plenty. It is a fact, that there are in Surrey, Kent, and Middlesex, within sound of the bells that Richard Whittington listened to, and many a London apprentice since has tried hard to hear ringing out the same tune,—some of the most glorious patches of scenery that bright sun ever shone upon. Talk of green lanes and flowery fields, and the idle days of our youth come back again in fancy. We are once more the fervent boy whom nobody understood, or perhaps cared to understand, wandering out by ourself amid the fields, with no companion but a book. Ah! those were the days when Shakspeare and Spencer had greater attractions for us than last night's debate, or the latest intelligence from France. What cared we then how the world wagged, so that we could bury ourself in the woes of Denmark's prince, or go sword in hand with Sir Calpine to the rescue of Serena.

And then the sunny spots out of town we knew so well; the lanes we traversed without meeting any more important personage than a farm-labourer; the green fields where we have lain luxuriously among the wild cowslips by the hour together; the bits of wood where we could wander uninterruptedly, and rave out our scraps of poetry without fear or chance of being overheard; the trees we have climbed to peep at the finch's speckled eggs; the dells where we have followed the brown squirrel as it skipped from branch to branch, or ran before us in the tiny sheep paths; the little solitary streams where we have watched the bright fish dart and jump in the clear sparkling depths; or seen the thousand May flies sport upon the sunlit surface; the deep shady knolls we have walked silently through, listening to the voices of the feathered choristers on leaf and spray as they sang their morning hymns to God; the solitary trees we have peered up into high above our head, to catch a glimpse of the wild pigeon's nest, just a few twigs set crosswise, through which the little eggs were visible. Oh! they were days of happiness, indeed.

A few years pass, and then a change. No longer do we take our walks alone. We have a companion, somewhat older but no less enthusiastic than ourself. The real business of life is just beginning—the heat of the battle becoming warmer and more warm—the strife and the struggle just hard enough to make us think seriously of overcoming them. In the morning, we read together out of hard, serious, thought-compelling books; in the evening, we walk in the fields, if it be summer, or sit beside our own fire-side, if it be winter, in all the independence of real householders. No matter that the apartment be the topmost room of a great, old, straggling house in a little, old-fashioned square, which is dignified by being called an inn of court—it is our own, and we are the masters of it, and of ourselves. A little relaxation now and then, a visit of courtesy to some rich man's mansion, or a passing glimpse of London life in its not most estimable features, only make us come back to our studies and our pleasures with the greater zest, and the lessons learned from the experience of ages are no less appreciated at home because, sometimes, two pairs of brawny arms have impelled a river-boat to Richmond, or slung a cricket-bat on Clapham Common. And so a half-a-dozen years pass on like one.

Change upon change. We dismiss one teacher only to take another. We are steadily learning to be a man; and a soft voice, and a gentle winning pair of eyes, help soon to teach us the great lesson. We marry. And there,—there our confessions terminate. The happiest state of man is marriage, if God but please to bless the union.

And what but a glance at Constable's exquisite picture has called up all these desultory ramblings? What but this "View near Hampstead"—so homelike, so beautiful, so thoroughly English—has led us into this indiscreet, gossipping humour? We are almost ashamed of ourself. Indeed, we should be quite, but that this long preface gives us something of a license to go on just as a man, having set himself up as the wit of the company, is obliged perforce to keep saying funny things to support the character he has assumed.

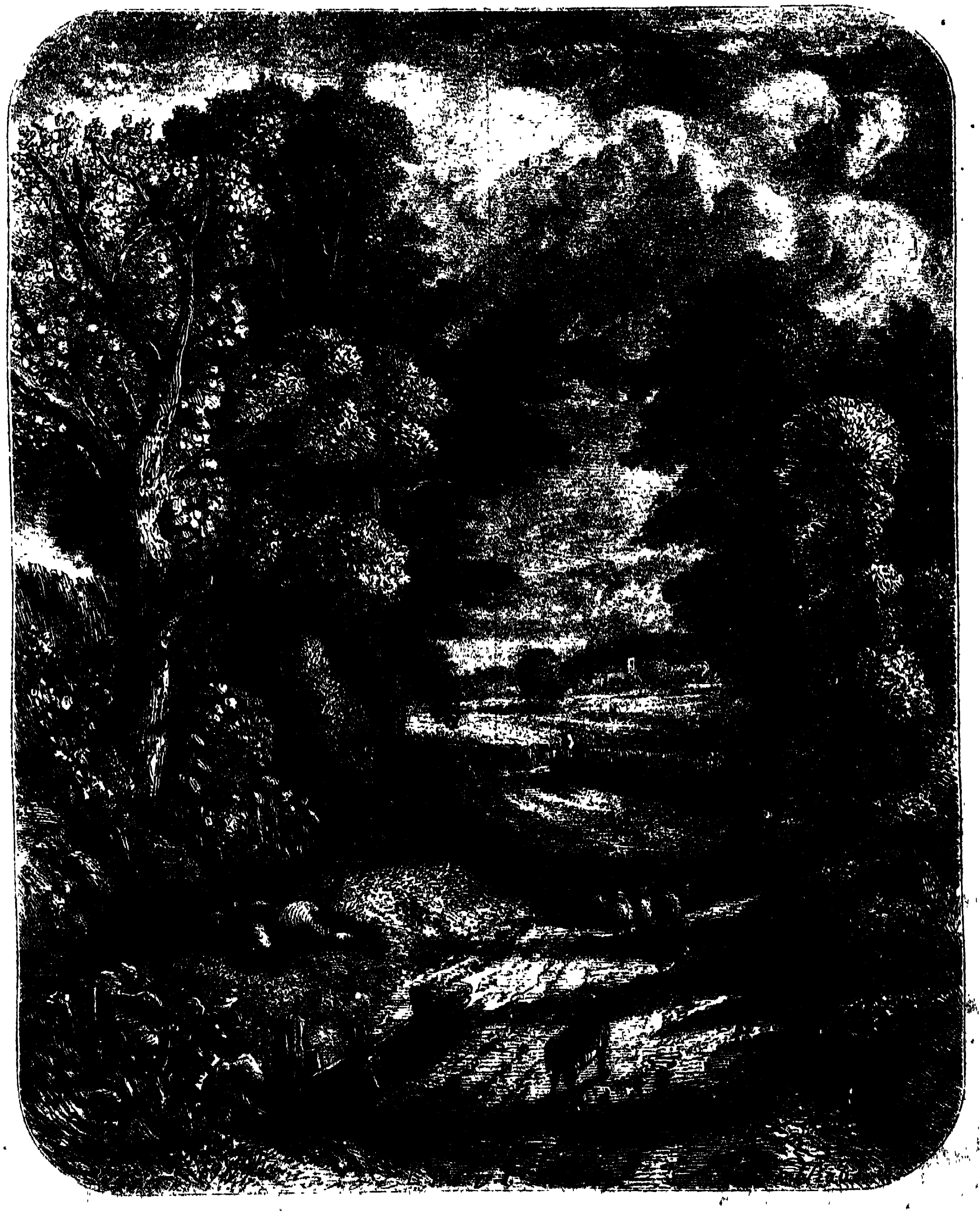
Well, then, Hampstead! There was a time—the time that we have hinted at, years agone—when we were better acquainted with that neighbourhood than we are now. There was a time when we were never tired of walking over the breezy heath, or treading the Vale of Health, or standing on the hill and looking down upon the great city at our feet, barely distinguishable through its veil of mist and smoke. That time, too, has passed. But still there are recollections clinging to the suburban village which will never die, were its fields built over to-morrow, and its hill and heath taken bodily within the boundaries of giant, insatiable London. Hampstead is classic in its memorials; for here dwelt authors and actors whose very names call up a host of reminiscences. Here Sir Richard Steele had the country house to which he took poor Savage to dinner, when the latter was meditating the publication of his close relationship to the infamous Countess of Macclesfield. From Hampstead Dr. Akenside the author of the "Pleasures of Imagination," removed to Old Burlington-street, Piccadilly, where he died. To this pleasant neighbourhood John Wilkes—who was elected alderman of Farringdon ward, while yet, says Walpole, "a criminal of state and a prisoner"—occasionally retired from his more aristocratic residence in Grosvenor-square. Not far from the heath lived John Gay, the fabulist, and author of the well-known "Beggar's Opera," a piece originally produced, in 1727-8, at the Lincoln's-inn Theatre, at that time under the management of Christopher Rich, whom we may suppose to have been a visitor to Hampstead, together with Colley Cibber, Congreve, Betterton, and Mrs. Bracegirdle, during the poet's residence here. The College of Surgeons now stands on the site of the little theatre in which Gay's great success of sixty-two nights took place. Booth the actor, and Rowe the author, were both residents in Hampstead; as was also Dr William Sherlock, author of "A Discourse on Death," &c., who not only lived, but died and was buried here. At a public-house on the heath, called the Upper Flask, were held the numerous meetings of the famous Kit-cat Club, of which Pope, Steele, Addison, and others of the wits and authors of the day, were proud to acknowledge their membership. A house in Hampstead, lately the property of James Pilgrim, Esq., is supposed to have been the last in which Sir Harry Vane resided, at the time of the Restoration, previous to his decapitation on Tower Hill, on the 14th of June, 1662; which house was afterwards graced by the occupation for many years of Dr. Joseph Butler, Bishop of Durham, and author of the "Analogy between Nature and Revealed Religion."

To go farther back still, it may be mentioned that Hampstead—originally Homestead—was a manor given by King Ethelred, father to Edward the Confessor, to the Church of Westminster, that at the dissolution of religious houses by Henry VIII., the manor of Hampstead was surrendered into the King's hands by its possessor, the then Bishop of Westminster; that it was given by the King to Sir Thomas Wroth "for special services," in whose family it continued till 1620, that at that period it was alienated to Sir Baptist Hickes, afterwards Viscount Camden, that it remained in the possession of his descendants, who became Earls of Gainsborough, till the year 1707, when the families of Langhorne, Maryon, and Weller—no relative of the Sam of that ilk—became lords of the soil, and that, at the present time, the lordship of the manor belongs to Sir Thomas Spencer Wilson, Bart., in right of his mother, the daughter of J. B. Weller, Esq.

Even from these slight and imperfect memoranda, it will be seen that Hampstead is a place of no mean importance—to say nothing of its once famous mineral springs, "in no wise inferior to those of Cheltenham," writes Mr. Goodwin, a surgeon of Hampstead, in 1802, its beautiful scenery, its handsome church, and its highly salubrious air, and to do nothing more than hint at the fact of the Romans themselves having appreciated its excellent situation—a fact evidenced by the occasional discovery of sepulchral urns, vases, lamps, and other antiquities, in the depths of its soil.

Through all this gossip we have said little of the painting, and nothing of the painter. The first, with its noble trees, its flock of sheep, its corn-field, its drover boy laving his thirst at the clear stream, its patches of sunlight breaking through the watery clouds, its mellow tone and admirable distance, speaks for itself; and for the last, there is, indeed, little to say. The life of a professional man is a mere catalogue of disappointments and successes, blended equally or unequally as the case may be. But we may as well tell the little that there is, and so make an end.

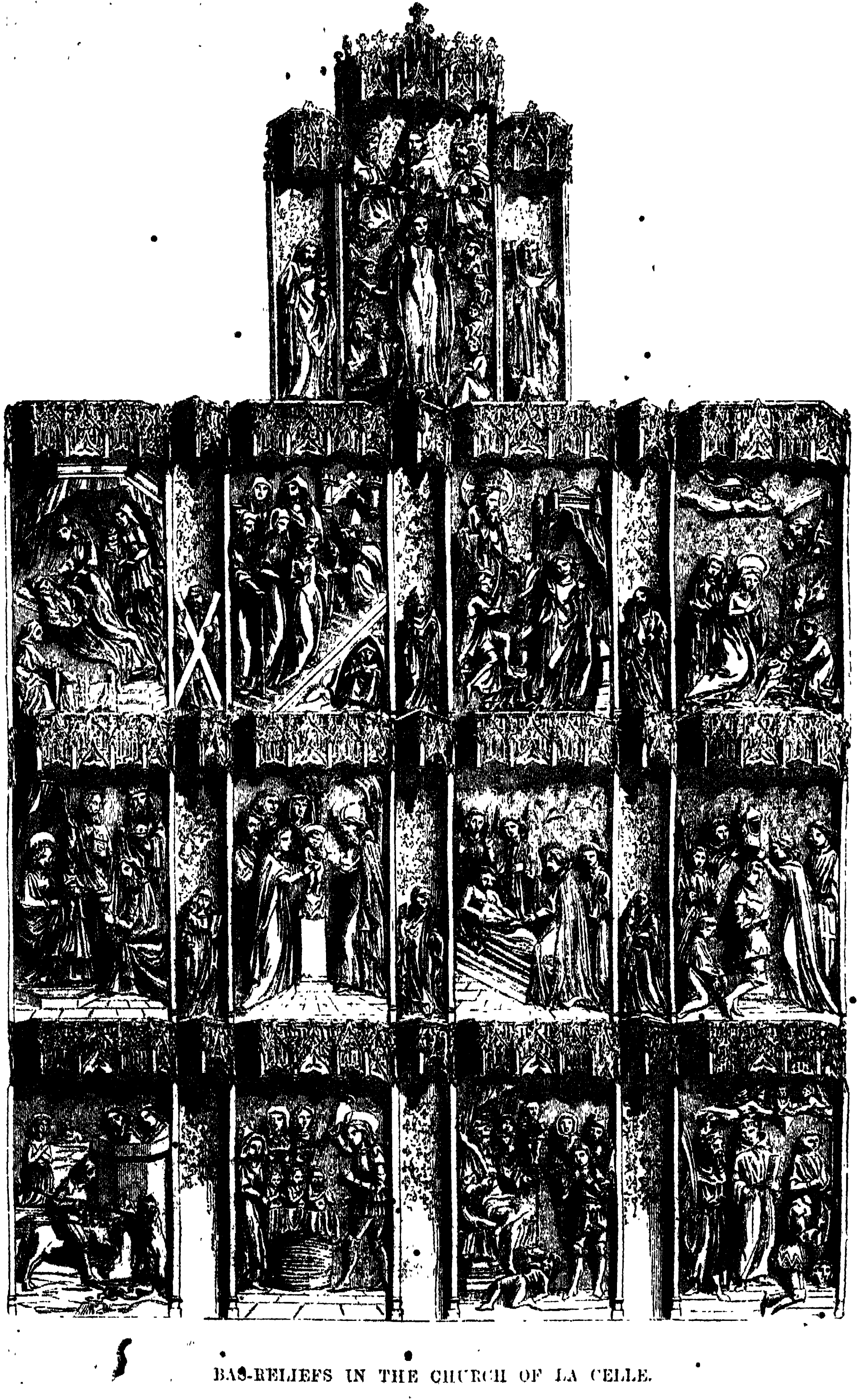
Like Rembrandt and Etty, our artist was the son of a miller; but, unlike the first, he was distinguished by the ease and truth of his productions; and as opposed to the second, he made nature rather than the human figure the object of his selection. He was born in the little village of Dedham, in Essex, in the year 1776, and to his early recollections may be attributed the frequent introduction into his pictures of mills, streams, running brooks, and peculiar atmospheric effects. Of his early life we know but little, and it was not till the year 1800 that he was admitted a student of the Royal Academy. That he was not highly successful in his first efforts may be inferred from his residence at this period in America-square, Minories, a not very fashionable place, near Whitechapel, at the east end of London. While living here, however, he exhibited a picture at the Academy, which was as much censured by some as it was admired and praised by others. It contained all the peculiar effects for which he afterwards became so celebrated—moist leaves, deep light and shadow, and a lowering sky. Indeed, for these effects he became so well known, that a saying of Fuseli's—"Give me my umbrella; I am going to see a picture of Constable's,"—was at one time pretty extensively circulated. In 1820 he was elected an associate of the Royal Academy, and from this time he continued to paint and exhibit annually those views of home scenery for which he has since become so well known. The scenery and atmospheric effects of the English climate were so thoroughly known to, and so admirably delineated by, Constable, that it is questionable whether any painter since Gainsborough and Wilson has so entirely made himself master of the moods and peculiarities of our variable weather and exquisite landscapes. He is said to have frequently declared that no artist need go abroad for beautiful views, and that on our own rivers, and in our own counties, might be found scenes which would vie in beauty and picturesque adaptation of parts with anything that the rest of Europe could boast. He even went so far as to say that artists who travelled to other countries for effects, did so because they were afraid to encounter those we possessed at home.



VIEW NEAR HAMPSTEAD, MIDDLESEX. FROM A PAINTING BY J. CONSTABLE, R.A.

Almost every artist is distinguished by three styles: the first an extremely careful, the next a firm and bold, and the last a loose and careless style. An examination of the works of the late royal academician, Turner, will exemplify this. But in the works of Constable an uniformly careful and minute style is discoverable throughout. All his pictures have England for their themes; and, as a thoroughly English painter, he takes a very high stand indeed. His conceptions were all national and all pure; his studies were of nature herself, and his early predilections may be traced through every one of them. In his latter years he inherited a fortune, which made him quite independent of professional gains. He was elected a member of the Royal Academy in 1829. Before his death he retired to Hampstead, to be in daily communion with the beauties of nature; and, much to the regret of the lovers of true art, he died, rather suddenly, at his residence, No. 35, Charlotte-street, Rathbone-place, on the 31st March, 1837.

The picture we have chosen for illustration is in the National Gallery.



BAS-RELIEFS IN THE CHURCH OF LA CELLE.

THE village called LA CELLE is situated upon the boundary line of the departments of *Eure* and *Orne*, in the valley of the Rille, in France. The church of this village, which is small, ill-built, and destitute of the graces of style, rises amidst scattered houses and verdant pastures. In itself it is scarcely worthy mention; but it has in it a large tablet or slab of alabaster, covered with figures in half-relief, which is not only curious, but ingenious in design, and somewhat clever in execution. Owing to its great age, and the softness of the material, some of the figures are mutilated, and a few nearly obliterated. These bas-reliefs, like most of those executed during the sixteenth century, have considerable interest, in spite of their imperfect execution. The artist will look in vain for anything approaching to grandeur of design or boldness of imagination; they are, on the contrary, remarkable for a simplicity bordering on childishness, and, occasionally, on the ludicrous. The bas-reliefs now presented to the reader furnish an apt illustration.

At that most interesting period termed the *Renaissance*, or revival of art, though the studios and workshops connected with the monasteries were not wholly uninfluenced by the general progress, yet the artists continued too scrupulously observant of the traditions and the *mannerisms* of former ages. Both objections may be urged against the object under consideration. The draperies are modest and simple in their folds; the expression in the countenances is calm and placid; but the attitudes in general are destitute of vigour, and, in many instances, untrue to nature. There is an absence of anatomical precision, and most of the accessories are stiff and monotonous. In point of design and execution, they bear a near resemblance to the ancient shrines and reliquaries in enamelled jewellery.

It is not necessary here to make many remarks on the *subjects* of these relieved sculptures. Genius and art may be eminently displayed in any subject. It is natural to expect that the subjects selected for illustration would be *religious*, taken either from the Bible or from the history of the Church; but, on most occasions, we find the representations mixed up with much that is legendary, mythological, or apocryphal. This is the case in the sculptures now before us. The *upper* compartment consists of a representation of the sacred Trinity, under which stands the Virgin Mary, surrounded by worshipping angels. In the *next* compartment are representations of the birth of the Virgin Mary; her presentation in the temple; the annunciation; and the birth of Christ in the manger. The *third* compartment represents the adoration of the infant Saviour by the Eastern Magi; and the circumcision of Christ in the temple. Here the narrative breaks strangely off, and the legendary history of St. George commences. The first division represents him as lying ill upon a couch, visited by the Virgin Mary, and attended by angels; and the second represents the same personages conferring upon him the honour of knighthood after his restoration to health. The *fourth* compartment represents his celebrated encounter with the dragon, while the king and queen are looking on from a sort of gallery, and the Virgin is praying for his success. The horse and the dragon, and indeed the whole of this division, must have been drawn by an artist little acquainted with the deeds of knightly enterprise, or even the forms of animals. Next we have St. George in the act of baptising infants; then cited before the judge, at whose feet, curiously enough, a merry-andrew, or buffoon, is playing strange antics, while a dwarf, seated on a high stool, is performing on the violin. The last compartment represents the decapitation of the martyr, in the presence of the judge and a sort of priest, while angels are seen above, bearing his winged soul upwards into heaven.

In nearly all the figures in these bas-reliefs the hands are made conspicuous, and, though thin and dry, they are not destitute of grace. The draperies of nearly all the figures are full, and some of them rather remarkable as to the mode in which they are disposed. The small statues which decorate the niches on each side of the compositions are executed in far better style than the bas-reliefs themselves. The traces of painting are visible throughout the whole; the prevailing colours of the draperies are blue, red, and gold.

The memorials of the past, recovered from ancient monastery or ruined church, are doubly interesting to us as evidences of the progress of art in various ages of the world. Here a sculptured column or a blazoned window, there a cross-legged knight upon a tomb, or a dim rusty monumental brass upon a mouldering wall, and elsewhere in buildings dedicated to religious services, the past comes back again to the minds of the curious, bringing with it instruction always. They were an industrious, pains-taking race, the artists of old. They loved their art for the art's sake, and in few things does their work show nobler than in the decorations which they hung about God's houses in the world.

THE ELEMENTS OF DESIGN.

The Society of Arts is labouring, with an enlightened and zealous spirit, in its appropriate sphere. They have had for some time under consideration the subject of Elementary Drawing-Schools in our Manufacturing Towns; and, having sent a deputation to Bradford, they have every reason to expect that a good and efficient school will be established there, and, with the aid of the authorities, successfully carried forward. Aiming to facilitate art-education, the Council offered premiums for the best colour-box to be sold retail for one shilling, and the best set of mathematical instruments for the use of beginners in geometry. They have just had the satisfaction of reporting that their efforts have been quite successful.

They have obtained a colour-box containing gamboge, lake, light red, ultramarine, vermilion, indigo, yellow ochre, vandyke brown, sepia, and burnt sienna, with three hair pencils—one large swan-quill size, and two middling-sized—which will be sold by all booksellers for one shilling, and will be found a very considerable reduction on the price of any other boxes of colours of similar quality. A case of mathematical instruments will also soon be ready for students and beginners in geometry, containing a twelve-inch ruler with scales, a rectangular triangle, and a pair of compasses with pen and pencil leg, fitted into a suitable box, which will be supplied retail for 2s. 6d. each; and another case of instruments, for proficients in drawing, has been selected, which will be found very complete and portable, and will be sold at the moderate cost of 6s. The Council trust that the effects of this movement will be so to enlarge the circle of consumers of materials for art-education, that the producers of them will find it to be to their interest to reduce the scale of charges, and thereby obtain increased profits from greatly-increased consumption.

To the Council of the Society, to its Committee for Elementary Drawing and Modelling-Schools for Artisans and Mechanics, and especially to H. Cole, Esq., C.B., and C. Wentworth Dilke, Esq., the public are much indebted for the efforts that have thus been made; and it will afford us great pleasure to aid them in carrying forward this department of their labours. We, therefore, commence with a paper on the Elements of Design, to be followed by others pointing out subsequent steps of the art.

The word design, as employed in the fine arts, is used in a limited and in a comprehensive sense. In the former case it strictly accords with the Italian *disegnare*, from which it is derived, and means the art of drawing, or representing in lines, the form of any object; and in this sense it is now to be considered. Its higher sense denotes that combination of invention and purpose which enables the artist to compose a group or a picture, without reference to the material in which it is executed. The ancient Greek sculptures display, in the highest degree, the accurate conception of form and beauty, and the designs of their sculptors cannot be surpassed, either in the perfection of physical form, or the invention of appropriate attitudes. In painting, Michael Angelo has obtained imperishable fame for his conception and execution of physical forms, only surpassed by that which the genius of Raphael has achieved. Still the foot must be placed on the lowest round of the ladder if the highest is to be attained. The greatest sculptor and the greatest painter had alike to become familiar with the first elements of art; and hence the due consideration of those on which we have now to dwell is absolutely indispensable.

Design is divided into two parts, "contour" and "shadow." *Contour* is a French word, synonymous with *contorno* in the Italian, and *outline* in the English language. So important was contour considered by Annibale Caracci, that he was accustomed to say, "Give me but a correct outline, and fill it up as you please." Our remarks, therefore, begin with *linear drawing*.

There are three kinds of lines—*straight* lines, *curved* lines, and *broken* lines. The straight line is the shortest course from one point to another; the curved line is neither straight nor broken; the broken line is formed of straight lines, which are not in the same direction.

In the *circumference* of a circle, all points are equally distant from the *centre*. The *radius* is the straight line which, issuing from the centre, touches the circumference. The *diameter* is the straight line which, passing through the centre, meets the circumference, and divides the circle into two equal parts. Every portion of the circumference is called an *arc*, and the straight line which joins the extremities a *chord*. The circumference is divided into 360 *degrees*, the degrees into 60 *minutes*, and the minutes into 60 *seconds*. The *circle* is the space contained within the circumference. It is desirable so to distinguish between these definitions, as not to confound the circumference with the circle. A *sector* is the portion of a circle contained between an arc and the radii which touch its extremities. A *segment* is the space contained between an arc and its chord.

An *angle* is the space enclosed between two straight lines which cut one another; the straight lines are the *sides* of the angle; the point at which the sides meet is the *vertex* of the angle. There are three kinds of angles. the *right* angle, the *acute* angle (which is less than the right), and the *obtuse* angle (which is greater than the right). When two lines cross one another, and form four equal angles, that is to say, four right angles, these lines are then perpendicular the one to the other. If, on the contrary, they form two acute and two obtuse angles, these lines meet obliquely. *Parallel* lines are those which, situated in the same plane, never meet, whatever may be the distances to which they are prolonged. The most simple of *polygons* is the *triangle*, of which there are several kinds—as the *equilateral* triangle, which has three sides and three equal angles; the *isosceles* triangle, which has only two sides equal; and the *scalene* triangle, of which all the sides are unequal. The *rectangular* triangle has one right angle, the side opposite to which is called the *hypothenuse*. The term *quadrilateral* describes the polygons which have four sides. The *parallelogram* has its opposite sides parallel, but the angles are not right angles. The *rectangle* has its sides unequal, but its four angles are right angles. The *square* has its sides equal and its angles right angles. The *rhombus* has its sides equal, but its angles are not right angles. A *diagonal* is a straight line drawn through a four-sided figure, joining two opposite angles. In the square and the rhombus the diagonals cut one another at right angles. In the rectangle and the parallelogram they are of the same length. Polygons having five sides are called *pentagons*; of six sides, *hexagons*; of eight sides, *octagons*; of ten sides, *decagons*, etc. When a polygon has all its sides and its angles equal, it is called a *regular* polygon.

It is necessary to mark the difference which there is between two *similar* figures and two *equal* figures. Similar figures are those which have equal angles and proportional sides; equal figures are those which have the angles and the sides equal each to each. Every surface on which a straight line may be continued, in every position, is called a *plane surface*, or a *plane*. Lines may be *perpendicular*, *oblique*, or *parallel* to a plane. Planes may also be perpendicular, oblique, or parallel one to another. The *projection* of a perpendicular on a plane is a point. When two planes cut one another, the points common to the two planes form a straight line which is called their *intersection*.

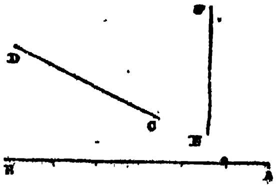
Bodies, which unite the three geometrical dimensions, are known by the name of solids. *Polyhedrons* are bodies bounded by planes; the *prism* is a polyhedron, formed by several plane parallelograms, and two plane, equal, and parallel polygons. In the *truncated prism*, the polygons are neither parallel nor equal. *Pyramids* are formed by several triangular, quadrangular, or polygonal planes, according to the shape of their base. The perpendicular, let fall from its apex to its base, is called the *axis*, or height of the pyramid.

By making a rectangle turn round one of its sides, a figure is generated, which is known by the name of a *cylinder*. According as the line around which the revolution is made is perpendicular or oblique, the cylinder is said to be *right*, or *oblique*. The base is always a circle. The right *cone* is the revolution of the rectangular triangle around one of the sides which form the right angle. The *cube* is a solid, and all the six sides of it are square. The solid of six sides, two of which are parallelograms, is called a *parallelopiped*.

We shall conclude this series of definitions with the *sphere*, which is a globe, every point on the surface of which is equally distant from the centre. The straight line from the centre to the surface is called a *radius*. Two radii, united in a straight line, form the *diameter*.

1. Draw a horizontal straight line, B A; fix the length of the horizontal, and prove if it is of the required size (Fig. 1).

Fig. 1.



2. Draw a vertical straight line, E F (Fig. 1).

3. Draw an oblique straight line, C D (Fig. 1).

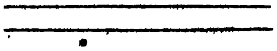
4. Divide the line A B into six equal parts, a hundred equal parts, &c. (Fig. 1.)

5. Divide a line into two, three, four, &c., equal parts.

6. Find out the length of a given line; prove with a measure that there is no mistake.

7. Draw a parallel, horizontal, vertical, or oblique line (Fig. 2).

Fig 2.



This operation is very often repeated in sketches from nature and the construction of planes; it is, therefore, of the utmost importance to be able to draw these easily.

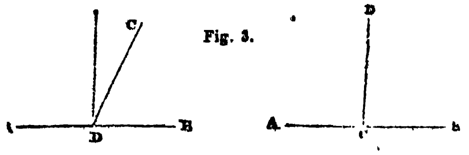


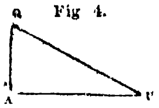
Fig. 3.

8. Draw a perpendicular, D C, to a horizontal line, A B (Fig. 3). See if the angles, A C D, B C D, are right angles, by means of the square.

9. Draw a right angle, A C D; an acute angle, C D B; and an obtuse angle, C D A (Fig. 3).

10. Draw a rectangular triangle, Q A U which has a right angle (Fig. 4).

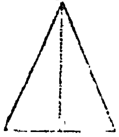
Fig 4.



The letter which marks the vertex of the angle is always placed in the middle of the three, thus—not A Q U, but Q A U (Fig. 4).

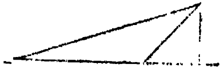
11. Draw an isosceles triangle, which has two sides and two angles equal (Fig. 5).

Fig. 5.



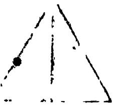
12. Draw a scalene triangle, which has its three sides and its three angles unequal (Fig. 6).

Fig 6.



13. Draw an equilateral triangle, which has its three sides and its three angles equal (Fig. 7).

Fig 7.



The height of the triangles is indicated by letting fall a dotted perpendicular on the base. In the right-angled triangle the perpendicular is one of the sides of the triangle (Fig. 7).

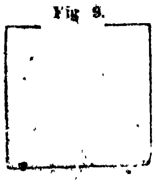
If the perpendicular falls without the base, we must continue the latter till the two sides intersect one another (Fig. 6).

Fig. 8.

14. Draw a right-angled parallelogram (Fig. 8).

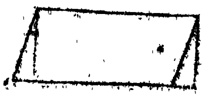
15. Draw a square (Fig 9), or a right-angled parallelogram with equal sides.

Fig 9.



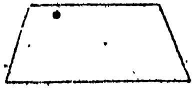
16. Draw an oblique parallelogram, which has its four sides opposite, without having its angles right angles (Fig. 10).

Fig 10.



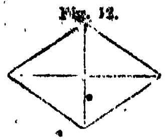
17. Draw a trapezoum (Fig. 11), two of whose sides only are parallel

Fig 11.



18. Draw a rhombus, which has its four sides equal, without having its angles right angles (Fig. 12).

Fig. 12.



In all these quadrilateral, or four-sided, figures, diagonals should be drawn. The intersection of the two diagonals in the right-angled quadrilaterals is the centre of the figure.

(*Continued on page* 142.)

IRON FOUNDING.

ALL the triumphs of art are but the extension of man's dominion over the material world. First to attain to the knowledge of the properties of the elements of which our earth is composed, and then to mould or combine them into whatever forms may prove most serviceable to mankind, are the objects towards which all the efforts of science are directed. Every year men are astonished at all they have done; and as every discovery is but an additional instrument for the achievement of greater ones still, the rapidity of our progress outstrips all the calculations, and even all the dreams, of past ages. Chemistry is a science of comparatively recent growth: it is not yet half a century since the genius of Davy made it the theme of the learned and the idol of fashion. But, notwithstanding all that he achieved in it, his labours seem now to have done little more than reveal to his successors the vast extent of the field which still remained unexplored. It is to men of our own day that the honour belongs of applying it to the arts

IRON FOUNDRY.

and working a total revolution in nearly all the branches of material industry.

Few of these have recently made greater advances than iron-founding. The working of a large foundry is, perhaps, one of the most striking spectacles in civilised life. The fusibility of metals is one of those properties from which mankind have reaped the greatest advantages. Works which, if attempted by means of the anvil, the hammer, and the file, would have required years of labour, are accomplished in a few minutes by casting, in the highest state of perfection. The art of moulding bronze and iron, too, appears to have been known at an early period of antiquity, but it is only in our own day that it has taken its place amongst the most useful branches of industry.

FURNACE FOR RE-MELTING PIG IRON.

But iron has now almost entirely superseded bronze as a material for ordinary purposes of utility. Its greatest advantage over bronze and copper lies in its greater cheapness, and to such a degree has this reached, that in many important works, such as bridges, for example, it has begun to take the place of wood and stone. It also possesses extreme hardness, and is consequently extensively used in the manufacture of articles liable to great wear from friction, such as the cylinders of steam-engines, &c., and for the same reason it is preferred for stamps, anvils, and hammers. When cast, also, it shrinks less in cooling than most other metals; and consequently, notwithstanding its apparent coarseness, it is capable of receiving and retaining impressions of the utmost delicacy and minuteness. The small ornaments, clasps, buckles, vases, statues, &c., of which so great a variety were to be seen at the Exhibition, and which are generally known as Berlin work, are evidences of its adaptability to all the purposes of art. Many of these were enriched with reliefs such as the graving-tool could produce only by a prodigious expenditure of time and labour; and if they are not held in much estimation, it is because their cheapness has rendered their acquisition too easy to allow them to prove the means of gratifying the vanity of the wealthy. But they are not, for this reason, less worthy of the admiration of all lovers of art, for no other metal could receive in moulding so exquisite a finish. The same substance, strange to say, which furnishes the terrible rows of guns which fill our batteries, and line the decks of our vessels, and which form the cylinders of the monster steam-engines, by the same process, can be moulded into rings, statues, and vases, which surpass the best works of the goldsmith in all but their value and brilliancy.

FLATTENING MACHINERY.

Although, in a great number of foundries, the iron is cast immediately on its issuing from the blast-furnace, this does not answer for works on a large scale, they cannot furnish materials for the employment of many hands; but in some of the great seats of industry there are foundries which receive the productions of the blast-furnaces scattered over the country for the purpose of casting them over again. This is, in many respects, however, a process attended with disadvantage, from the loss of a portion of the iron by oxidation, and the great expense of the fuel necessary to melt it: but some compensation is afforded by the possibility of working on a great scale.

The blast furnace, it may be necessary to explain, is intended to change the iron ore into what is called "pig-iron." The pig-iron is the material out of which *iron* and *steel* are made. The transformation which takes place in the process may be readily understood. The ore, as it is dug from the mine, is a combination of iron with oxygen gas, which is diffused through the air, and is the great supporter of life and combustion. Oxygen has a great tendency to unite with iron. The ordinary rust is nothing more than the combination of oxygen with the metal. But great as this tendency is, the tendency to unite with carbon or charcoal, under the influence of strong heat, is still greater. When, therefore, the iron ore is placed in the blasting-furnace, the oxygen which was in combination with the iron deserts it to combine with the charcoal. The iron thus left in rude masses is the pig-iron. The process when the ore contains foreign substances is, of course, more complicated, but our space will not permit us to enter into it.

It is now ready to be cast into the form which it is intended finally to assume. Two different sorts of furnaces are employed in casting. The first are called *cupola* furnaces, the interior of which is almost cylindrical, and terminates at the bottom in a sort of trough. Their height varies, according to the extent of the foundry, from six to seven feet. The fire is kept up by a blast-pipe, or bellows, and within the iron and charcoal are placed in alternate layers. There is usually a considerable number of furnaces of this kind, in order to furnish a sufficient quantity of molten iron for the casting of large articles. But, generally, when the piece of work to be undertaken is of large size, *reverberatory* furnaces are employed. These are furnaces in which the iron and the metal to be cast are separated. A coal fire is lighted in a grate, and the metal is placed at one side upon a sort of platform. The fire and all is covered over by a vaulted roof, and from this the heat is reflected strongly upon the metal—hence the name.

When it is completely fused, it is suffered to escape into a sort of trough, and is thence conveyed in buckets to the moulds. These are usually of sand, which sometimes contains a mixture of chalk, and at others it is quite pure. The former has greater hardness and adhesiveness than the latter, and is used where the mould must support great weight. When pure sand is used, great care is taken to prevent its giving out its moisture; as, in case it becomes dry, it loses all solidity; and for this reason the mixed sand is generally made use of in casts which require accuracy.

When the impression is to be taken on one side only, as in the case of the plates of fire-places, the molten iron is simply poured into the mould, and the operation completed without difficulty. But when the object has to be moulded round, the labour is much greater. The mould is then divided into two parts, and the workman is obliged to take care that the two sides fit exactly when they come to be screwed together. Various modifications of this process are adopted to suit the greater or less delicacy and fineness of the design on the article, but which want of space will not permit us to describe.

Our engraving may serve to convey to the reader a good idea of a large foundry. At the farthest end may be seen the furnace. The founder is preparing to stop up the taphole, and the others are hastening to fill the cauldrons and buckets with the fiery liquid. A number of cranes overhead communicate with one another by turning on their axes. These cranes carry the cauldrons, suspended by chains, from the sort of small vehicle which runs freely upon its upper arm. In our engraving there are three of these cranes, the first of which is placed within reach of the furnace; the other is in the foreground. The workmen are engaged in casting large pieces, probably the felloes of a fly-wheel, and are standing around the edge of the mould, pouring in the liquid out of the cauldron, which they turn over by the help of iron bars. Others run around it above and below, and set fire to the gas, which escapes through the insterstices caused by the wood, which is inserted to give consistency to the mass of sand. At the foot of the crane are five men turning the wheel, to direct the cauldrons to their appointed place. The foreman, with his back to the spectator, has his hand raised, as if in the act of giving orders to the workman. In the foreground a man is passing the sand for moulding through a screen. On one side is a sort of frame, divided into a great number of compartments, and, when the stream of iron is directed into it, a great number of pieces will be formed from the single jet. Three workmen, armed with a sort of pestle, are occupied in breaking up the sand placed around the models in the compartments.

Our second engraving represents the process of re-melting the pig-iron, and effectually separating it from all foreign substances. The furnaces in this case are heated with coke, in the manufacture of which great care is required, to preserve its purity.

The third engraving shows the iron under the action of the "flattening mills," by which it is rolled out into plates in a finished state, ready for application to any required purpose.

THE ELEMENTS OF DESIGN.

Continued from page 130.

Fig. 13.

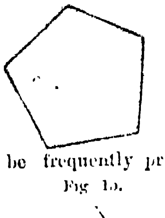
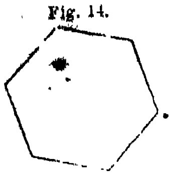


Fig. 14.



19. Draw a regular pentagon (Fig. 13), which has five sides and five angles equal.

20. Draw a regular hexagon, which has six sides and six angles equal (Fig. 14).

All the figures now given are very simple, and should be frequently practised. It will be well to delay, till this is done, the drawing of irregular figures.

Fig 15.

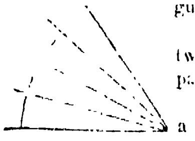
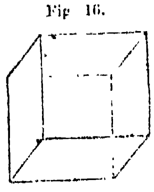


Fig 16.



21. Divide an angle into two, three, and four equal parts.

22. Double or quadruple a given angle (Fig. 15).

23. Draw a right-angled parallelopiped, (Fig 17), and an oblique-angled parallelopiped (Fig. 18.)

Fig. 17.

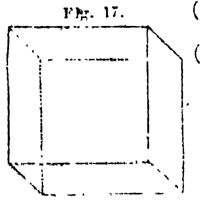
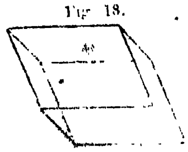


Fig. 18.



24. Draw a cube (Fig 16).

Fig 19.

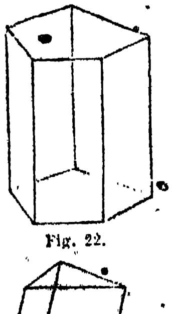
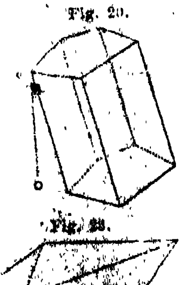


Fig. 20.



25. Draw some prisms (Figs. 19, 20, 21, 22, 23).

Fig. 21.

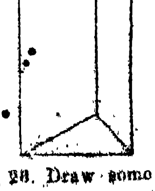


Fig. 22.

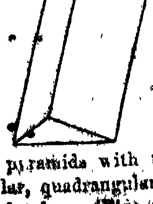
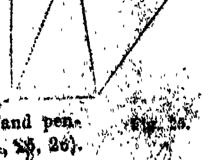


Fig. 23.



26. Draw some pyramids with triangular, quadrangular, and pentangular bases (Figs. 24, 25, 26).

Fig. 24.

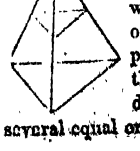
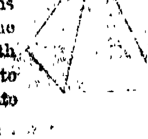
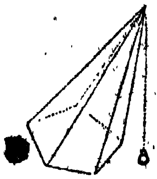


Fig. 25.



Such are the different figures which may be described by means of the straight line. After the pupil has familiarised himself with them, it will be well for him to double, treble, or divide them into several equal or proportional parts.

Fig. 26.



27. Draw a circle (Fig. 27).

Fig. 27.

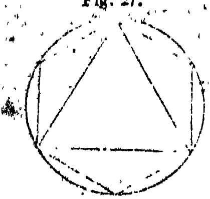
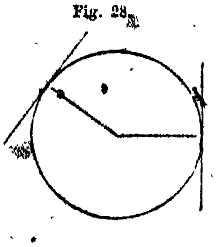


Fig. 28.



28. Determine the centre of a given circle (Fig. 30).

29. The centre and the radius of a circle being given, to construct a circle (Fig. 30). We cannot urge pupils too strongly to practise frequently the drawing of this figure. It is done by means of compasses.

Fig 29.

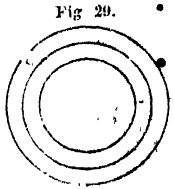
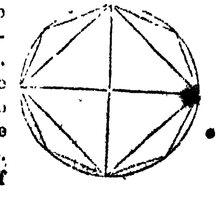


Fig. 30.



30. Divide a circle into three, five, seven, &c., equal parts (Fig. 27).

31. Divide a circle into four, six, eight, &c., equal parts (Fig. 30).

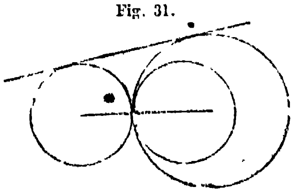
32. Describe an arc of a circle, and draw tangents to a circle (Fig. 28).

33. Inscribe some regular polygons in a given circle (Figs. 30 and 27).

34. Circumscribe a regular polygon about a given circle.

35. Describe concentric and equidistant circles (Fig. 29).

Fig. 31.

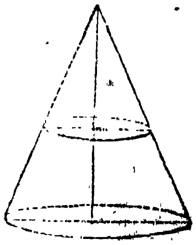


36. Draw circles touching one another externally (Fig. 31).

37. Draw circles touching one another internally (Fig. 31).

38. Draw a tangent to two given circumferences (Fig. 31).

Fig. 32.



39. Draw some right cones (Fig 32).

40. Draw some oblique cones (Fig. 33).

41. Draw a truncated right or oblique cone (Figs. 32 and 33).

42. Draw some right cylinders (Fig. 34).

43. Draw some oblique cylinders (Fig. 35).

F g 33.

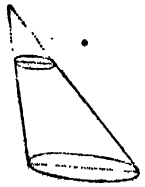


Fig. 34.

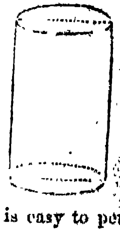
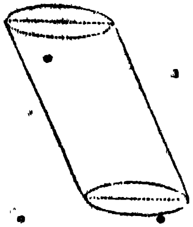


Fig. 35.



44. Lastly, draw a sphere, and subdivide it into zones by parallel circles, or into segments by meridians (Figs. 37, 38).

Now, it is by an union of all these lines that we are able to represent every imaginable form. Whatever the kind of drawing may be, it is easy to perceive, after the preceding remarks, how important it is to study *linear* drawing before undertaking drawing from *nature*.

Fig. 36.

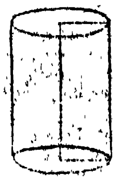
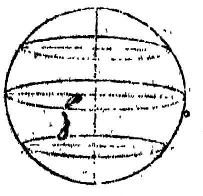
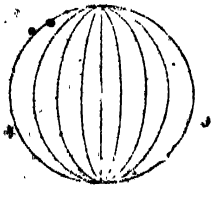


Fig. 37.



F g. 38

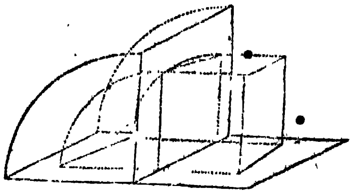


Before entering on the second part of linear drawing, it will be well to offer some advice which may aid the progress of pupils; we purpose, therefore, speaking of the method of procedure when the object which it is wished to copy is before the eye.

It is impossible to include, at a single glance, the *tout ensemble* and the *details* of any scene. Method is therefore necessary in depicting it, and we must begin with the mass before the smallest detail is touched. If this important precaution be neglected, we may be certain, beforehand, that the drawing will be faulty in the general, and unpleasing in its character.

We are about to give an idea of projections by pointing out the most useful principles of this department of science. The object of the theory of projections is either to represent all the external forms of bodies on a plane, or to resolve on plane figures which represent them diverse problems, as might be done on the bodies themselves.

Fig. 39.



The foot of the perpendicular, let fall from a point to a plane, is called the projection of a point on a plane (Fig. 39).

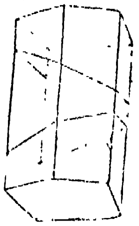
Any line whatsoever, straight or curved, being composed of points, its projection is the line which unites the feet of all the perpendiculars let fall from the different points of the line. If the plane of the projection is horizontal, this projection will be called horizontal. If it is vertical, the projection will be called vertical. There is no difficulty, then, in understanding that the union of two projections gives the position of the line in space, since it is the intersection of the projecting planes if it is straight, and the intersection of the projecting cylinders when it is curved.

The position of a line in space not being determined by a single projection, we must have recourse to two; but as a leaf of paper is a single plane, it may be supposed that the vertical plane falls upon the horizontal plane by turning round their point of intersection, which is called a ground-line. It is very important to become familiar with this idea; for often, in the construction of certain problems, it is needful to re-establish the real position of the object.

It is easy to conclude, from the very definition of projections, some very simple and constantly-recurring propositions: we confine ourselves now to the enunciation of them.

Every prism or cylinder raised perpendicular on a plane, is projected according to its base, as well as al the figures traced on its surface. Every straight or curved line, but parallel to the plane of projection, is equal to its projection on this plane (Fig. 40).

Fig. 40



The next article on drawing will be on PERSPECTIVE.

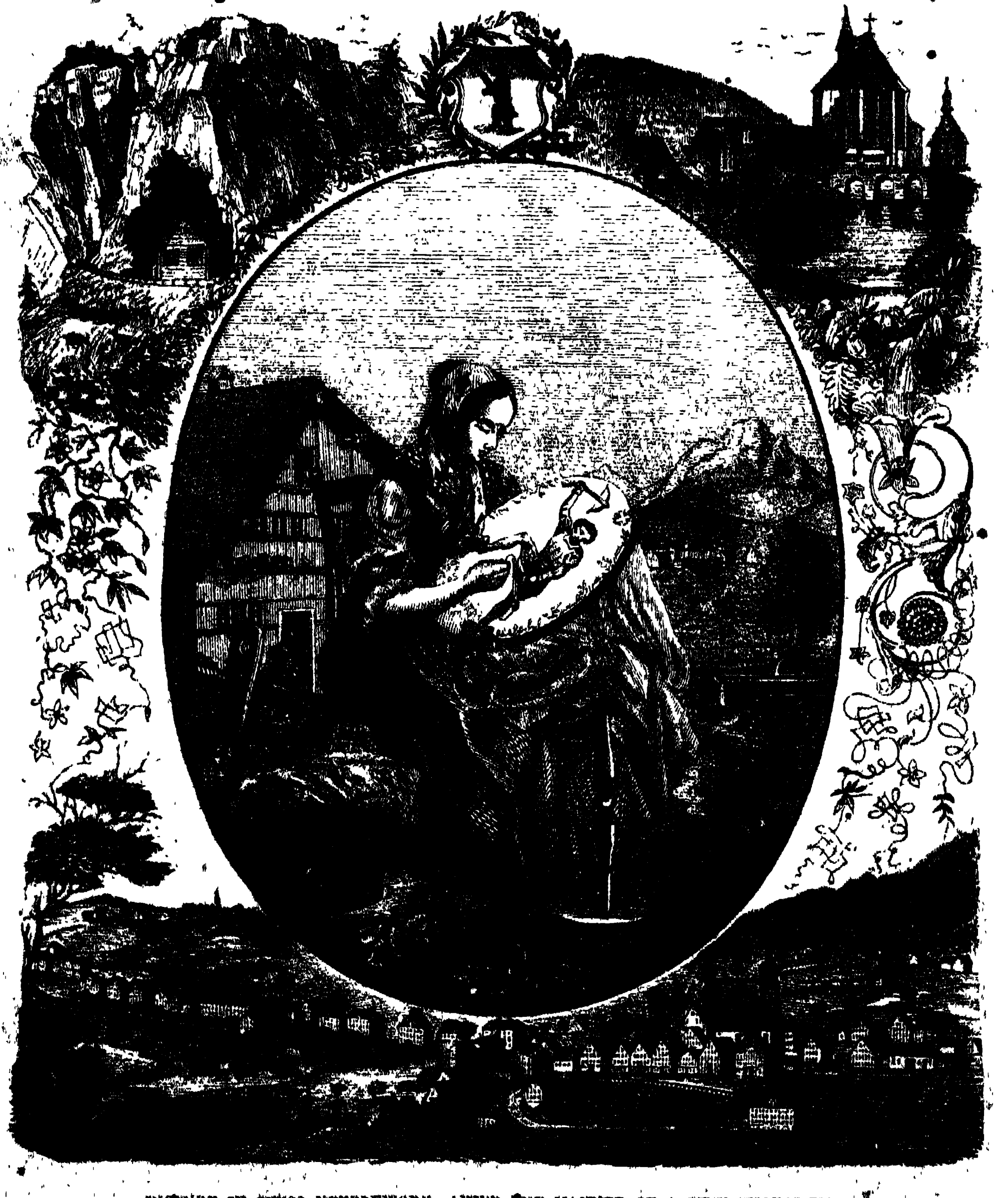
THE RAILWAY TRAIN.

POESY is creation; whoso planned
Railways—the mighty veins and arteries,
And telegraphic wires, the nerves of nations,
And fiery engines rushing o'er the land
Swifter than flight, or ploughing through the seas
'Gainst wind, and tide, and elemental strife,
Promethean spirits, conquering time and space,
And quickening all the pulses of their race
Throughout one vast organic globe of life,
Made rich by them with wonderful creations
Such as the opiate fancy never dreamed,
Even in Araby—*poets* should be deemed,
If any should; for poetry is "making"
As well as writing—to be seen no less than said.

Lo! here is poetry—the Railway Train!
First the shrill whistle, then the distant roar;
The ascending cloud of steam, the gleaming brass,
The mighty moving arm; and on amain
The mass comes thundering like an avalanche o'er
The quaking earth; a thousand faces pass—
A moment, and are gone like whirlwind sprites
Scarce seen; so much the roaring speed benights
All sense and recognition for a while;
A little space, a minute, and a mile.
Then look again, how swift it journeys on—
Away, away, along the horizon
Like drifted cloud, to its determined place;
Power, speed, and distance melting into space.

SWISS NEEDLEWORK.

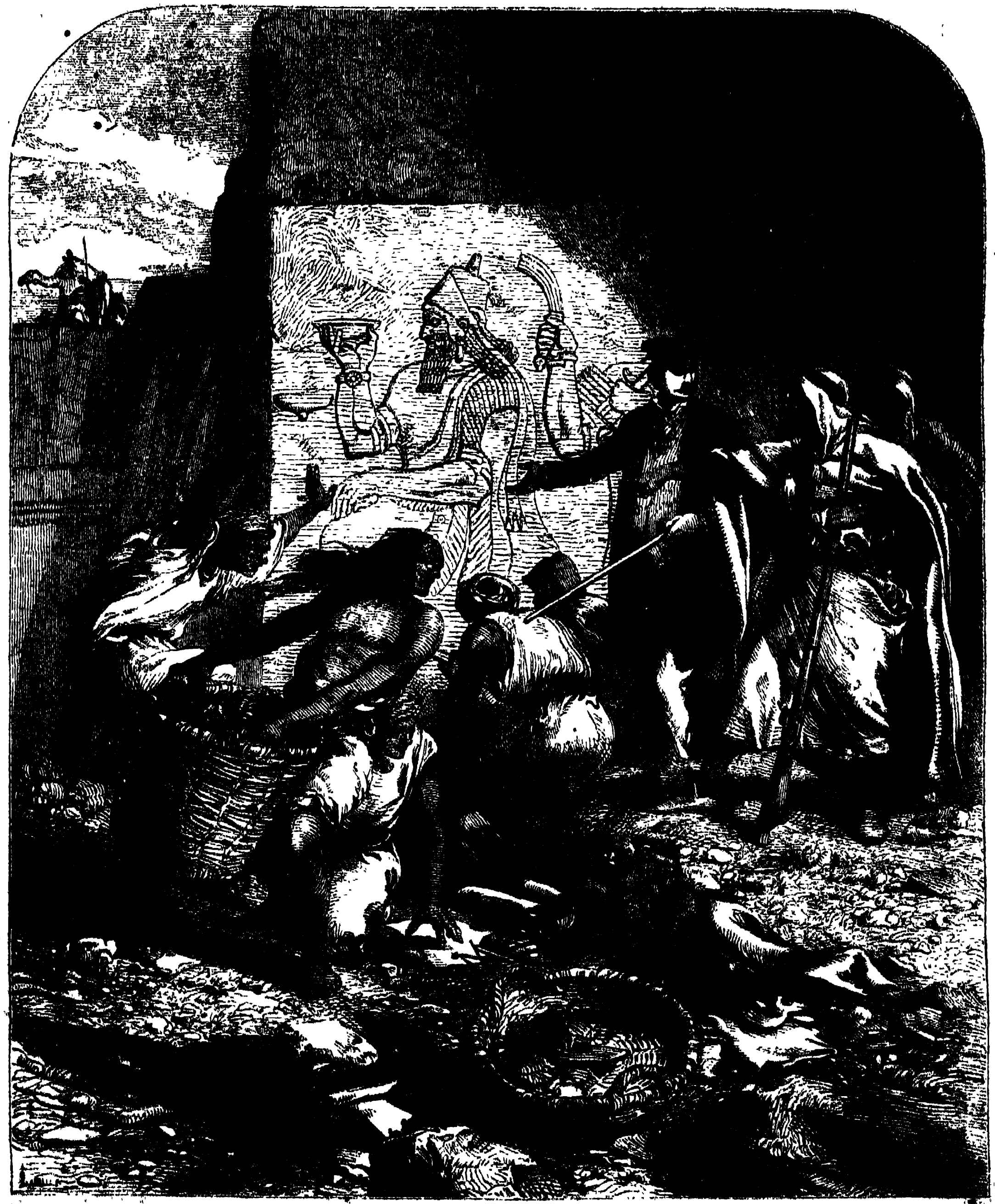
To vary as much as possible our descriptions of needlework, we have selected a picture which was exhibited at the Crystal Palace, by Mr. F. U. Tanner, of Bühler, in the canton of Appenzell, Switzerland. It represents a peasant-girl sitting at her cottage-door with an embroidery-frame in her hand, at which she is employed in painting with her needle—if the expression be allowed—a portrait of William Tell, the beloved hero of Switzerland. In the back ground is seen a village, with its little stream and trees in front, and a mountain-peak behind. The border is composed of various scenes in the neighbourhood: the cottage under a rock, with the chamois wandering among the declivities; a Swiss church, bridge and stream; and a view of the village of Bühler, in which the exhibitor resides, the whole forming an excellent copy of a line engraving. It is executed in black and white silk on a neutral-coloured ground, also of silk, the various lights and shades being produced by means of a greater or lesser number of stitches. The method of producing needlework pictures of this description is very simple. Having provided a piece of white or light grey silk the size of the engraving to be copied, it is stitched on a frame, and the picture worked upon it in the ordinary embroidery stitch. Of course the number, length, and variety of the stitches must depend greatly on the nature of the subject. Skies are produced by a series of long parallel stitches attached to the back-ground here and there, just sufficiently to keep them tight; and in some instances it is necessary to work one stitch over another, in order to obtain the requisite depth of colour. In trees, flowers, and so on, the radiation of the stitches must be carefully attended to, and in some parts of the work it will be found necessary to make a number of short stitches cross and re-cross each other, in order to produce the appearance of what the engravers call cross-hatching. This kind of work will be seen in the lower part of the girl's dress. The ornamental parts of the border are easily copied, and the ordinary needle alone is required for work of this kind. If carefully performed, "print-work," as it is called, is very beautiful, and the quality of it is estimated entirely by the amount of difficulty in producing the different lights and shades. No knowledge of drawing is requisite; in fact, all that has to be done—and that is quite tedious enough sometimes—is to produce an exact *fac simile* of the engraving required. Of course any variety of colours can be introduced; but it must be remembered that the surface of the whole must be kept as smooth and flat as possible.



PICTURE IN SWISS NEEDLEWORK, AFTER THE MANNER OF A LINE ENGRAVING.

This kind of work is very much pursued in the eastern parts of Switzerland; and in the canton of Neufchâtel there are employed upwards of 3,500 females in hand-embroidery alone, the principal part of which is for exportation. No fewer than forty-five manufacturers from various parts of Switzerland exhibited needlework, embroidery pictures, worked handkerchiefs, sewed muslins, and such-like productions of female industry.

ANCIENT NINEVEH.



DESIGNED BY GILBERT.] LAYARD'S DISCOVERIES AT NIMROUD. [ENGRAVED BY H. LINTON.

Is it true that the light from some of the more distant fixed stars takes ages multiplied by ages to reach this our earth, and that what we see are not the bodies as they now exist, but as they existed some thousands of years ago? All science is thus carrying us into the past. Geology has made us acquainted with a pre-adamite earth, and various forms of organised being as peculiar to that earlier world. What was considered as nothing more than so much gold-dust scattered on the black ground of the heavens, our modern astronomy has resolved into a field of suns and systems, whose mingled light goes to make up so many splendid constellations, and whose date is to be found far down in the depths of a past eternity. Nor this only. The recent discoveries of the site and ruins of ancient cities, enable us to walk their streets, and leisurely view those palaces in which lived and luxuriated some of the mightiest princes that ever impressed the soil of this our world, the temples in which they worshipped, the tombs in which they were buried, and the monuments which were reared in memory of their deeds and of their name. We find ourselves in the immediate neighbourhood of the hanging gardens, and of those marvellous structures which tradition has referred to a very remote antiquity. Our knowledge is likely to be rectified and enlarged concerning a people who were supposed to have left behind them no trace of their historical life. These ruins will henceforth testify, not only to the fact of their existence, but to their progress in civilisation, in intellectual culture, in physical science, and in artistic skill.

France and England divide the glory of having rescued from the underground darkness and oblivion of twenty-five centuries, some of the most magnificent remains of the old world. Many a traveller's foot had pressed those mounds which are found on the banks of the Tigris, but it was reserved for M. Botta and Dr. Layard to discover the treasures which they concealed. They prosecuted their researches with exhaustless patience and perseverance; and though the story of the people which once inhabited these cities of renown, is to be read in bricks, and stones, and slabs, and bas-reliefs, and monumental inscriptions, yet, as our distinguished countryman observes, "there could have been no more durable method of preserving the national records: the inscribed walls of palaces and rock tablets have handed down to us the only authentic history of ancient Assyria;" while by the discoveries of himself and others, the intention of those who founded that great empire "will be amply fulfilled, and the records of their might will be more widely spread, and more effectually preserved by modern art, than the most exalted ambition could have contemplated."

Nineveh, the capital of Assyria, was situated on the eastern bank of the river Tigris, opposite the present town of Mosul, about two hundred and eighty miles north of Babylon, whose rival it was, but of much larger dimensions. It was about twenty miles in length, twelve in breadth, sixty in compass, and took three days' journey to perform its circuit. It was surrounded by walls a hundred feet high, and so wide that three chariots could drive abreast upon them, and was fortified by fifteen hundred towers of two hundred feet in height, while the population exceeded six hundred thousand. This number is small compared with the inhabitants included in the metropolis of either England or France, and yet neither Paris nor London occupies one-fourth of the space on which Nineveh stood. It is probable, therefore, that a large portion of the ground was occupied with gardens, and parks, and vineyards, and fields for pasturage. Its grandeur was equal to its size. Even at that early age, architecture had attained to high perfection, and its productions were on a gigantic and magnificent scale. Science and art had combined to create a place of commanding elegance, while in wealth and luxury it rose to the highest point.

The whole current of tradition leads us to Nimrod as the founder of this great city. He was an immediate descendant of the patriarch Noah, and a man of rare courage and enterprise. His successful pursuits in the chase marked him out as one peculiarly fitted to sustain the duties and responsibilities of government; and having obtained for himself a name in the earth, he left the land of Shinar, where he first founded his dominion, and went into Assyria, and builded Nineveh, the city Rehoboth and Calah, and Resen between Nineveh and Calah. Such is the simple record of the Book concerning the man whose name is inseparably associated with one of the earliest settlements of the human race. But here Revelation leaves us. Scripture is all but silent on Assyria and the Assyri[illegible]ll we come comparatively near to the reign of grace—or, [illegible] Layard says, "until the period when their warlike expeditions to the west of the Euphrates brought them into contact with the Jews. Pul, the first king whose name is recorded in Scripture, having reigned between eight and nine hundred years before the Christian era, and about two hundred previous to the fall of the empire, must have been nearly the last of a long succession of kings who had ruled over the greater part of Asia. The later monarchs are more frequently mentioned in the Bible on account of their wars with the Jews, whom they led captive into Assyria. Very little is related even of their deeds, unless they particularly concern the Jewish people." Then if we come to profane history, it has no record of a date so far back as the foundation of the Assyrian empire. The account ascribed to Herodotus is irrecoverably lost; while the testimony of later writers is to be taken with so much reserve and limitation, that it is like the effort to trace the characters on the sand which the waters of the rolling wave have effaced and washed out for ever. With the exception of a few royal names, and some of those of doubtful origin, we have nothing in the form or worthy of the name of authentic history. Ninus, Semiramis, and Sardanapalus, are names familiar to every school-boy in the land. Of the expeditions of the first, and the magnificent deeds of the second, and the profligacy of the third, he has read in his common school-history, but what does he know of Assyria and its far-famed capital? What does any one know? Strange, indeed, that "the records of an empire, so renowned for its power and civilization, should have been entirely lost; and that the site of a city as eminent for its extent as its splendour should for ages have been a matter of doubt. It is not perhaps less curious that an accidental discovery should suddenly lead us to hope that these records may be recovered, and this site satisfactorily identified."

It is to the Sacred Writings that we must turn for all our knowledge of this famous city, from the time of Pul, the first king of Assyria, who invaded Canaan, till the final overthrow of Nineveh. Scripture sets us down in the midst of that city when it had reached the height of its glory and the extreme of its crime. Wealth, luxury, and idolatry, were all so many causes of its overthrow. The sins and crimes of the people pointed to heaven as conductors to attract the lightning of divine vengeance. But judgment slumbered. Mercy triumphed over justice. A divinely-commissioned prophet was sent to warn them of their danger, and lead them to a timely repentance. His representations and pleadings were not without effect; and for one hundred and fifty years the impending stroke was averted. Nineveh would have been spared had her repentance been sincere. The lightning which played on the edge of the dark cloud retired, and would never have left that dark-bosomed cloud, had not the people fallen back into their former habits and pursuits. They sunk deeper than before in moral pollution, and then another of God's true speakers was sent to foretell the overthrow of the city and the empire. The preparations for the destruction, and the destruction itself, he paints in the most vivid colours. He calls on Nineveh to prepare for the approach of the enemy; while the military array and muster, the very arms and dress of the Medes and Babylonians—their rapid approach to the gates—the process of the siege—the inundation of the river—the taking of the place—the captivity, the lamentation, and the flight of the inhabitants—the sacking of the city—the bearing away of its treasures—together with the consequent desolation and terror—are all set forth under the sublimest and most impressive images, and in the true spirit of Hebrew poetry. There was an old tradition that Nineveh should not be taken till the river Tigris, which defended part of the city, should become its enemy. Now it so happened that, in the third year of the siege, it became so swollen by continued rains, that it overflowed part of the city, and threw down a considerable portion of the wall. The king, thinking that the oracle was fulfilled by this inundation of the river, and giving up all hope of future safety, lest he should fall into the enemy's hands, built a large funeral pile in the palace; and having collected all his gold and silver, and royal vestments, together with his concubines and his eunuchs, set fire to the pile; and thus involved himself and them, and the whole palace, in one common ruin! When the fate of the king was made known by certain deserters, the enemy entered by the breach which the waters had made, and took the city. So vivid is the description given by the prophet of their entering the devoted city, that you fancy you hear the whip cracking, the horses prancing, the wheels rumbling, the chariots bounding after the galloping steeds; or that you see the reflection from the polished swords and the glittering spears, like flashes of lightning dazzling the eyes; while the slain or the dying are lying in heaps upon the street, and the horses and the chariots stumbling over them. Even her rulers and her tributary powers came not to her help or succour. Those who ought to have espoused her cause, went over to the side of her besiegers. Her numbers, her wealth, her mighty men, availed her not. She became faint-hearted and feeble, and her strongholds were taken with ease. She is in the hand of the enemy; her desolation is complete. The prophet himself is moved to tears by her condition, and, in a tender and beautiful allegory, represents her as an illustrious princess, led away into captivity, attended by her maids of honour, who bewail her and their own calamity by beating their breasts and tearing their hair, in token of grief deep and inconsolable, while the nations whom she had oppressed are seen and heard exulting with joy over her fall.

The overthrow of this great city took place about six hundred years before the evangelical era; and in the second century there was not a single monument of it remaining; nor could any one exactly determine the spot on which it stood. Till a very recent period it was conceived that its site was never to be known—that this eternal oblivion of the very place was part of the sublime prediction. Bishop Newton went so far as to believe that the ruins on the eastern shore of the Tigris—the very ruins on which Layard has been working with so much enthusiasm—are the ruins of the Persian Nineveh, and not of the Assyrian; and that the ruins of the old Nineveh had long ago been ruined and destroyed. This pleased the sceptic and the infidel. Taking advantage of the concession of the learned prelate, and of others who have assumed the same ground before him, and well knowing that there was no authentic history to which to appeal, they at once resolved the sacred narrative into a myth—a creation of the fancy—a mere fiction—and thus sought to set aside the whole of divine Revelation. All doctrine rests on facts, and facts are the very *materiel* of history. Reduce the histories to mere fiction, and the book goes for nothing. But facts are immutable, and it is on its facts that the Bible rests its lofty claim. How wonderfully are its statements verified and confirmed by the progress of time, and science, and discovery! Not that the Revelation of God stands in need of any outward evidence to attest its truth. A man has only to refer to his own moral consciousness to be convinced that it is true. But if men will appeal to external proofs, then every day is multiplying these proofs. It is no longer necessary to ask the same amount of faith, for faith is being more and more converted into sight. Not only can it be proved that there was such a city as Nineveh, but it is rising up again before our eyes; and by the time that one traveller has completed his researches, and another has deciphered the inscriptions which are so mysteriously written on the ruins, the history of that city will so harmonize with the sublime predictions of the inspired Scriptures, that the infidel will be struck dumb. Our distinguished countrymen do not positively affirm that they have so mastered the characters in which these inscriptions are written, as to give a literal and perfect translation of any one record, or to make it incontrovertible that they are exploring the palaces and temples of the old Assyrian capital. This is the modesty common to all truth-loving and truth-seeking men. But so far as they have gone, they are inclined to believe that all the ruins explored represent the site of the ancient Nineveh, and that by the time they have completed their labours, each fragment and each inscription will go to establish the identity of those remains with the city which Nimrod founded, and which Nabopolassar destroyed.

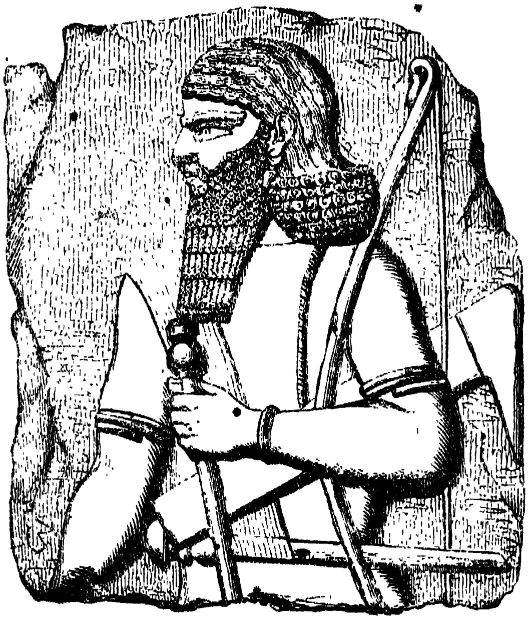


Fig. 1. BUST OF A WARRIOR.

It appears that rather more than thirty years ago some attempts were made to explore these ruins by Mr. Rich, who was for many years the political resident of the East India Company at Baghdad. He first examined the remains near Hillah, in the neighbourhood of his own residence, in which he found fragments of inscriptions, a few bricks and engraved stones, and a coffin of wood. He then visited Mosul, and was attracted to the opposite side of the river by the report of certain pieces of sculpture having been dug up in one of the mounds there; but he could not obtain even a fragment of it. After visiting the village containing the tomb of Jonah, he next examined the mound known by the name of Konyunjik, but found only a few fragments of pottery; so that, "with the exception of a small stone chair, and a few remains of inscriptions, he obtained no other Assyrian relics

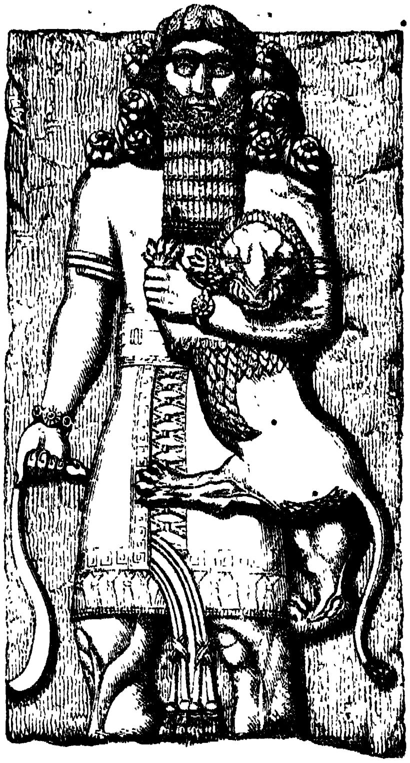


Fig. 2.

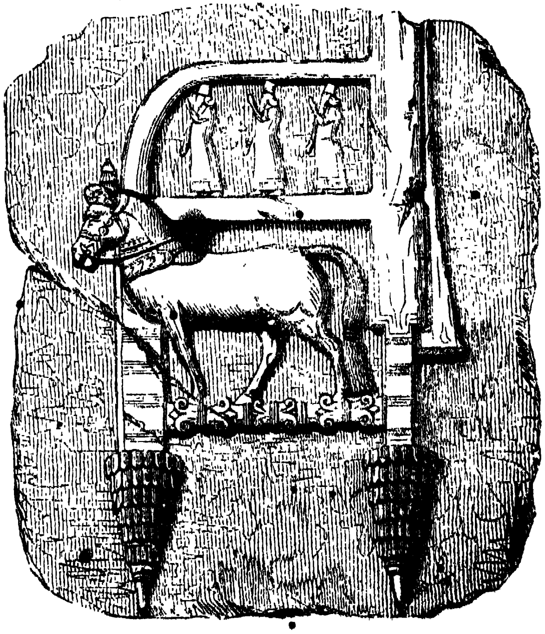


Fig. 3. THRONE.—(*See page* 154.)

from the site of Nineveh; and he left Mosul, little suspecting that in the mounds were buried the palaces of the Assyrian kings.". And will it be believed that these few fragments, which were subsequently deposited in the British Museum, formed almost "the only collection of Assyrian antiquities in Europe? A case scarcely three feet square inclosed all that remained, not only of the great city of Nineveh, but of Babylon itself."

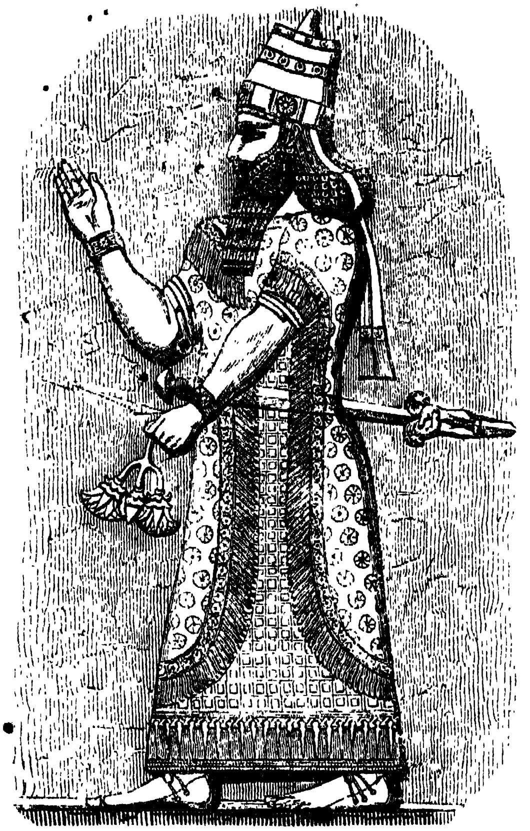


Fig. 4. A KING.

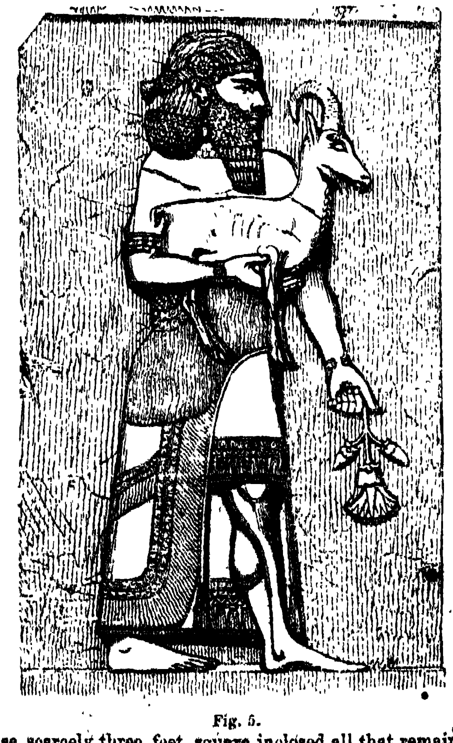


Fig. 5.

What was wanted to follow up these limited researches was some truly enterprising spirit, with means and men at his command. He already existed. Dr. Layard, who had been wandering through Asia Minor and Syria, during the autumn of 1839 and the early winter of 1840, "felt an irresistible desire to penetrate to the regions beyond the Euphrates," rightly judging that without treading on the remains of Nineveh and Babylon, his pilgrimage would not have been complete. He left Aleppo on

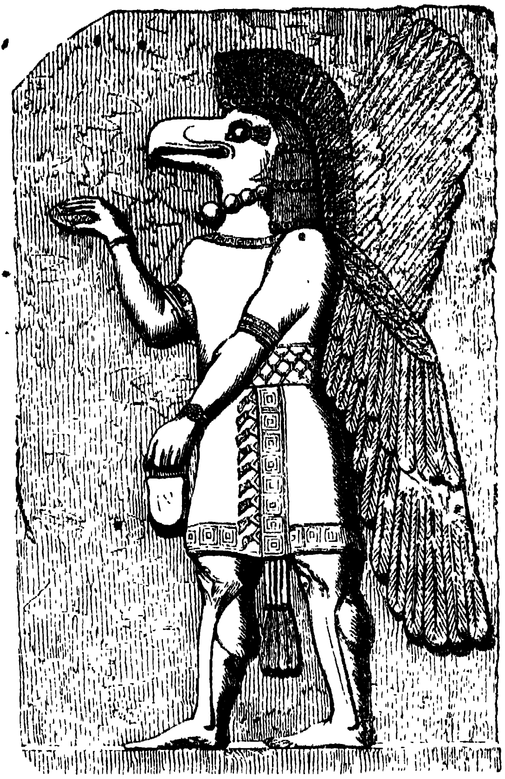


FIGURE WITH EAGLE'S BEAK. Fig. 6.

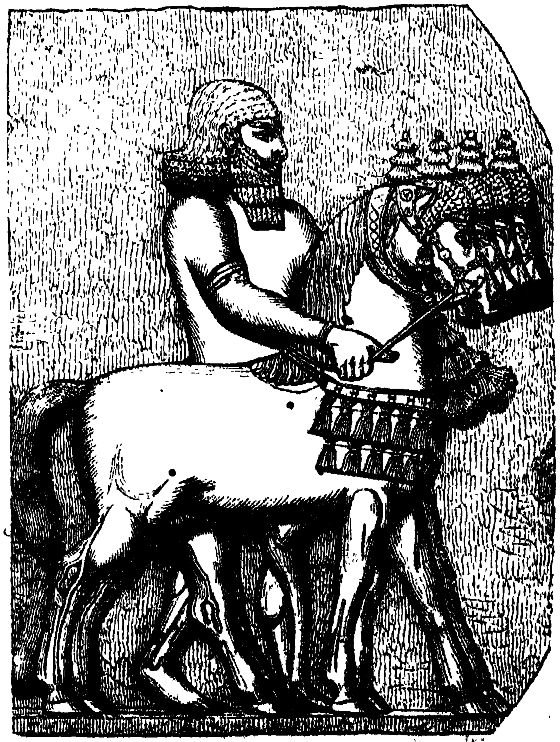


Fig. 7.

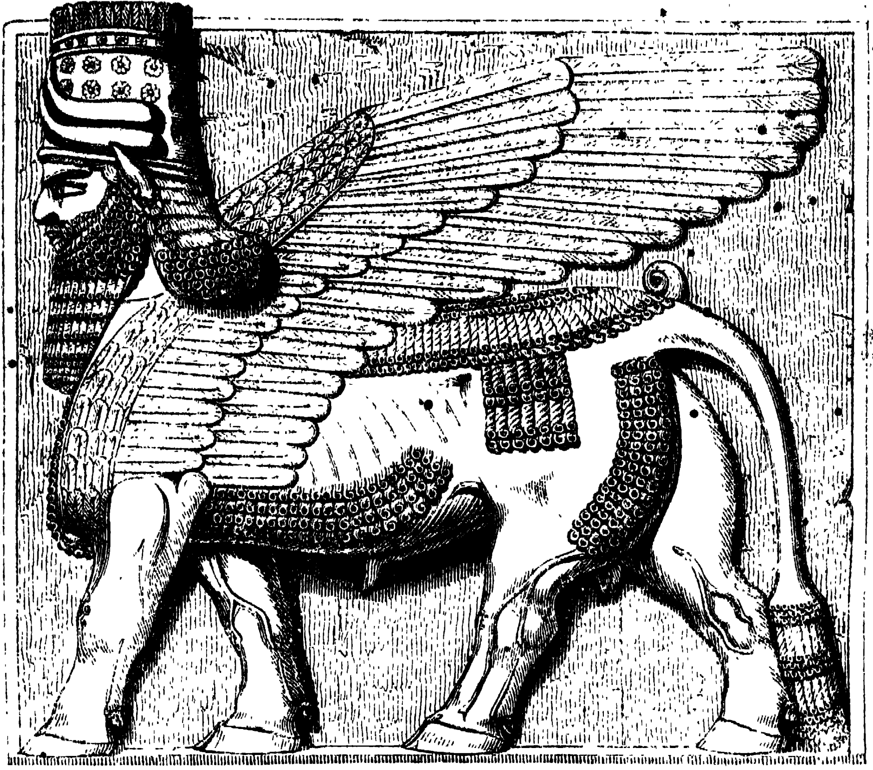


Fig. 8. WINGED BULL.—(*See page* 151.)

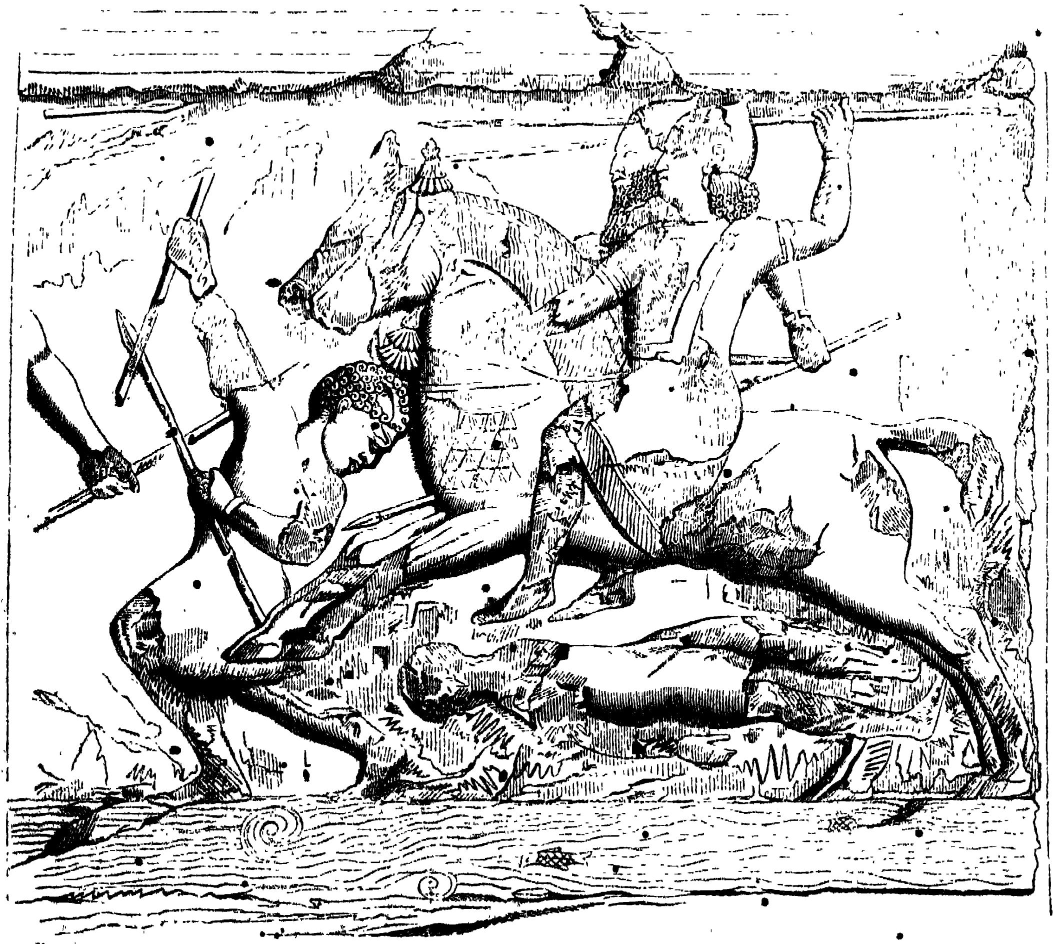


Fig. 9. BAS-RELIEF.—(*See page* 152.)

the 18th of March, and entered Mosul on the 10th of April. In the middle of the same month, he left Mosul for Baghdad, and as he descended the Tigris on a raft, he again saw the ruins of Nimroud, and had a better opportunity of examining them. It was evening as he approached the spot. "The spring rains had clothed the mound with the richest verdure, and the fertile meadows which stretched around it were covered with flowers of every hue. Amidst this luxuriant vegetation were partly concealed a few fragments of bricks, pottery, and alabaster, upon which might be traced the well-defined wedges of the cuneiform character."* His curiosity was powerfully excited, and he was resolved thoroughly to examine these remains. Circumstances interfered with the prosecution of his object, and withdrew him from the scene of labour. It was not till the summer of 1842, that he again passed through Mosul on his way to Constantinople. He had not forgotten Nimroud; but then he had no time to explore ruins. He found, however, that M. Botta, the French consul at Mosul, had commenced excavations on the opposite side of the river, in the large mound of Kouyunjik. From Constantinople he wrote to M. Botta, encouraging him to proceed in his excavations. He did so, and to him is due the honour of having found the first Assyrian monument. This remarkable discovery, Dr Layard tells us, "owed its origin to the following circumstances:—The small party employed by M. Botta were at work on Kouyunjik, when a peasant from a distant village chanced to visit the spot. Seeing that every fragment of brick and alabaster uncovered by the workmen was carefully preserved, he asked the reason of this, to him, strange proceeding. On being informed that they were in search of sculptured stones, he advised them to try the mound on which his village was built, and in which he declared many such things as he wanted had been exposed on digging the foundations of new houses. M. Botta, having been frequently deceived by similar stories, was not at first inclined to follow the peasant's advice, but subsequently sent an agent and one or two workmen to the place. After a little opposition from the inhabitants, they were permitted to sink a well in the mound, and at a small distance from the surface they came to the top of a wall, which, on digging deeper, they found to be lined with sculptured slabs of gypsum. M. Botta, on receiving information of this discovery, went at once to the village, which was called Khorsabad. Directing a wider trench to be formed, and to be carried in the direction of the wall, he soon found that he had entered a chamber connected with others, and surrounded by slabs of gypsum, covered with sculptured representations of kings, warriors, battles, sieges, and similar events. His wonder may be easily imagined. A new history had been suddenly opened to him - the records of an unknown people were before him. He was equally at a loss to account for the age and the nature of the monument. The style of art of the sculptures, the dresses of the figures, the mythic forms in the walls, were all new to him, and afforded no clue to the epoch of the erection of the edifice, or to the people who were its founders. Numerous inscriptions, accompanying the bas-reliefs, evidently contained the explanation of the events there recorded in sculpture, and, being in the cuneiform, or arrow-headed character, proved that the building belonged to an age preceding the conquests of Alexander. . . . It was evident that the monument appertained to a very ancient and very civilised people, and it was natural from its position to refer it to the inhabitants of Nineveh—a city which, although it could not have occupied a site so distant from the Tigris, must have been in the vicinity of these ruins. M. Botta had discovered an Assyrian edifice, the first, probably, that had been exposed to the view of man since the fall of the Assyrian empire."

The discovery of Botta was made known to the French Academy of Fine Arts, whose members lost no time in applying to the Minister of Public Instruction for pecuniary means to carry on the excavations. Ample funds were guaranteed to the happy discoverer, and an artist of acknowledged skill was sent to take sketches of such objects as could not be removed. The success of the Frenchman heightened the desire of our own devoted countryman to turn his attention to the ruins and antiquities of Assyria. His thoughts were fixed on Nimroud. In the autumn of 1848, through the liberality of Sir Stratford Canning, he was in circumstances to enter on his grand enterprise. He left Constantinople without acquainting any one with the object of his journey, and in twelve days he found himself in the town of Mosul. He presented his letters to the governor of the province, but concealed from him the object which he had in view. Nimroud was seven hours' journey from Mosul; but he hastened thither, took up his abode in the hovel of an Arab, to whom he revealed the object of his visit, and to whom he held out the prospect of regular employment, and assigned him fixed wages as superintendent of the workmen. This pleased the Arab; and the shadows of night having fallen upon the world, our traveller retired to rest. He could not sleep. "Hopes, long cherished, were now to be realised, or were to end in disappointment. Visions of palaces underground, of gigantic monsters, of sculptured figures, and endless inscriptions, floated before him." Morning dawned, and his host, who had walked to a village three miles distant in the middle of the night, stood without with six Arabs whom he had brought with him to be employed in the works. The ruins were no longer covered with verdure, and the absence of all vegetation enabled him the more successfully to examine the remains. Broken pottery and bricks inscribed with the cuneiform character lay scattered all around. The Arabs watched his every movement, and brought him handfuls of rubbish for examination. To his inexpressible joy he found the fragments of a bas-relief, and concluding that sculptured remains must exist in some part of the mound, he sought and selected a place where he might commence his operations in earnest and with the hope of success. His first day's efforts were rewarded with the discovery of slab after slab—then of a chamber, and then of a wall, all enhanced by the inscriptions which they bore. This was enough. Next day, having increased the number of his men, he renewed his labours with increased interest. Before the evening he found himself in a room panelled with slabs, about eight feet in height, and varying from six to four feet in breadth. The bottom of the chamber was paved with smaller slabs than those which lined the walls. At his feet he found several objects in ivory, with traces of gilding.

Amid manifold difficulties, discouragements, interruptions, self-denials, and more than common sacrifices, he prosecuted his labours, but much of his time was spent in merely clearing away the rubbish which surrounded or concealed the ruins. His grand ambition was to bring the tools of his workmen into contact with some sculptured figures. He succeeded. By perseverance his Arabs completely exposed to view two slabs, on each of which were two bas-reliefs divided by an inscription. In describing these he says.—"In the upper compartment of the largest was a battle-scene, in which were represented two chariots, each drawn by richly-caparisoned horses at full speed, and containing a group of three warriors. The principal figure was clothed in a complete suit of mail of metal scales, embossed in the centre, and apparently attached to a shirt of felt or linen. This shirt was confined at the waist by a girdle. On his head was a pointed helmet, from which fell lappets, covered with scales, protecting the ears, lower part of the face, and neck, the whole head-dress resembling that of the early Normans. His left hand grasped a bow at full stretch, whilst his right drew the string, with the arrow ready to be discharged. The left arm was encircled by a guard, probably of leather, to protect it from the arrow. His sword was in a sheath, the end of which was elegantly adorned with the figures of two lions. In the same chariot, were a charioteer urging on the horses with reins and whip, and a shield-bearer who warded off the shafts of the enemy with a circular shield, which, like those of Solomon, and of the servants or shield-bearers of Hadad-ezer, king of Zobah, may have been of beaten gold. The chariots were low, rounded at the top, and edged by a rich moulding or border, probably inlaid with precious metals or painted. To the sides were suspended two highly-ornamented quivers, each containing, beside the arrows, a hatchet and an axe. . . . . The chariot was drawn by three horses, whose trappings, decorated with a profusion of tassels and rosettes, must have been of the most costly description. The archer, who evidently belonged to the conquering nation, was pursuing a flying enemy. Beneath the chariot-wheels were scattered the conquered and the dying, and an archer, about to be trodden down, was represented as endeavouring to check the speed of the advancing horses." The lower portion of this relief represented the siege of a castle or walled city. On the other slab were sculptured two warriors—the foremost in a pointed helmet, riding on one horse, and leading a second; the other, without helmet, standing in a chariot, and holding the reins loosely in his hands. On the lower part of the same slab were depicted the battlements and towers of a castle, while a woman stood on the walls, tearing her hair, in token of deeper grief. Future excavations led to the discovery of the principal palace, with its walls, and sculptured slabs, and colossal figures. The most perfect of the bas-reliefs represented a king raising his extended right hand, and resting his left upon a bow, with a captive enemy or rebel crouching at his feet. Having removed the workmen from the south-west corner of the ruins in which these remains were found, he resumed his excavations in the north-west division, opened a trench more in the centre of the edifice, and in two days he reached the top of an entire slab, standing in its original position, and on which were two human figures considerably above the natural size, and in admirable preservation. Judging from their attitude, and dress, and other circumstances, they appeared to represent divinities presiding over the seasons, or over particular religious ceremonies; for near to the slab with these figures was found THE HOLY TREE, or tree of life, so universally adored at the remotest periods in the east. The figures were back to back, and from the shoulders of each sprang two wings. Clothed in robes similar to these winged forms, a human body, surmounted by the head of an eagle or a vulture, next came into view, and was probably designed, by its mythic form, to typify the union of certain divine attributes. Such figures seem to have abounded in Assyria (See Fig. 6). A human body with the head of a lion, and the wings of an eagle —the same body with an eagle's head, and wings attached :—a lion with a human head, and outspread wing :—a bull of the same description : these have all been found, and must all be regarded as parts of one great complex system of symbolism. To these unnatural objects of worship more than one allusion is made in Scripture. There was no error against which the ancient prophets protested with more loud and solemn voice than that of idolatry, and yet there was no sin of which the Jew was more frequently and fearfully guilty. The Israelites, in addition to their former gross idolatries, received the impure idolatrous worship of the Assyrians, who became their neighbours by the conquest of Syria; and, like them, the inhabitants of Judah connected themselves with the Assyrians, and became enamoured with their idols; and then with the Chaldeans, whose idols they adopted, at the same time retaining their attachment to the Egyptians and their idolatrous rites. It is to these facts the prophet Ezekiel refers when, in the discharge of his sacred office, as an exile on the banks of the Chebar, and in the neighbourhood of Nineveh itself, he thus reproves the idolatry of the old Theocratic church:—"She doted upon the Assyrians, her neighbours; captains and rulers, clothed most gorgeously - horsemen riding upon horses—all of them desirable young men. . . When she saw men pourtrayed upon the wall, the images of the Chaldeans pourtrayed with vermilion, girded with girdles upon their loins, exceeding in dyed attire upon their heads, all of them princes to look to—deified men—after the manner of the Babylonians in Chaldea, the land of their nativity; and as soon as she saw them with her eyes, she doted upon them, and sent messengers unto them into Chaldea;" and hence she is told that the Babylonians, and all the Chaldeans, Pekod, and Shoa, and Koa, and all the Assyrians with them—all of them desirable young men, captains and rulers, great lords and renowned, all of them riding upon horses—should come against her with chariots, waggons and wheels, and with an assembly of people which should set against her buckler, and shield, and helmet round about, while an offended God would leave her in their hand to waste and devour her. Who can doubt that the prophet had seen the objects which he so graphically describes? His description of the figures sculptured upon the walls and painted, perfectly corresponds with the interior of the Assyrian palaces, as is now proved by the monuments rescued from the ruins of Nimroud and Khorsabad. His chambers of imagery were the counterpart of things which really did exist. The dark and polluting idolatry of the Jew was but the reflection of the moral impurity of the surrounding nations.

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* A few words as to this cuneiform character. It is a character whose component parts bear a close resemblance to a wedge, or the barb of an arrow, or a nail. Each letter is composed of several distinct wedges; and, according to Layard, this cuneiform or wedge-like character, under various modifications, prevailed over the greater part of Western Asia to the time of the overthrow of the Persian empire by Alexander the Great; and that it is to this fact that we mainly owe the progress that has been made in deciphering the Arabian inscriptions.

The winged human-headed lions, of which several have been found, and of which the representation of a winged bull (Fig. 8) will give the reader some idea, seem to have formed so many entrances into the principal chambers or apartments of the palace. They differ in form—the human shape being continued so far as the waist, and including human arms. These figures are about twelve feet in height, and about the same number in length. The symmetry and development of every part are perfect. Expanded wings spring from the shoulder, and spread over the back. A knotted girdle, ending in tassels, encircles the loins. In musing on these mysterious emblems, and in endeavouring to resolve their intent and history, Dr. Layard emphatically asks—"What more noble forms could have ushered the people into the temple of their gods? What more sublime images could have been borrowed from nature by man who sought, unaided by the light of revealed religion, to embody the conception of the wisdom, power, and ubiquity of a Supreme Being? They could find no better type of intellect and knowledge than the head of the man; of strength, than the body of the lion; of ubiquity, than the wings of the bird. These winged human-headed lions were not idle creations, the offspring of mere fancy—their meaning was written upon them. They had awed and instructed races which flourished three thousand years ago. Through the portals which they guarded, kings, priests, and warriors had borne sacrifices to their altars, long before the wisdom of the East had penetrated to Greece, and had furnished its mythology with symbols recognised of old by the Assyrian votaries. They may have been buried, and their existence may have been unknown before the foundation of the eternal city. For twenty-five centuries they have been hid from the eye of man, and they now shine forth once more in their ancient majesty. But how changed was the scene around them! The luxury and civilization of a mighty nation had given place to the wretchedness and ignorance of a few half-barbarous tribes. The wealth of temples, and the riches of great cities had been succeeded by ruins and shapeless heaps of earth. Above the spacious hall in which they stood, the plough had passed, and the corn now waved. Egypt has monuments no less ancient and no less wonderful; but they have stood forth for ages to testify her early power and renown; whilst those of Nineveh have but now appeared to bear witness, in the words of the prophet, that once 'the Assyrian was a cedar in Lebanon, with fair branches, and with a shadowing shroud of a high stature, and his top was among the thick boughs—his height was exalted above all the trees of the field, and his boughs were multiplied, and his branches became long, because of the multitude of waters where he shot forth. All the fowls of heaven made their nests in his boughs, and under his branches did all the beasts of the field bring forth their young, and under his shadow dwelt all great nations; for now is Nineveh a desolation, and dry like a wilderness, and flocks lie down in the midst of her: all the beasts of the nation, both the cormorant and the bittern, lodge in the upper lintels of it; their voice sings in the windows; and desolation is in the thresholds.'"

Having once found an entrance into the grand palace, chamber led into chamber, each with its sculptured walls and more than fabled figures. What the ring on the back of the lion (Fig. 11) is meant to symbolize we know not. The noble animal is in bronze, and of one piece, and the cast displays great faithfulness to nature. One slab represented the king holding a bow in one hand, and the arrows in the other, followed by his attendant eunuch bearing a second bow and a quiver for his use, and a mace with a head in the form of a rosette, while his ministers and his servants are pourtrayed in the humblest posture of submission. These figures, which were exquisitely finished, were about eight feet high, and the ornaments rich and elaborate, one of them carrying an antelope, such as still abound on the hills in the neighbourhood (Fig. 5), and having a branch of the holy tree in his hand. Of winged giants, vizirs, and their attendants, cap-

COLOSSAL SCULPTURES, DISCOVERED BY M. BOTTA.—(*See page* 154.) Fig. 10.

tives and tribute-bearers, eagle-headed figures, castles built on an island in a river, battles, sieges, and other historical subjects (Fig. 9); warriors escaping from the enemy; a combat with a lion, in which the latter is being strangled (Fig. 2); hunting scenes in which the monarch is the principal actor, and in which his courage, wisdom, and dexterity were as much shown as in martial exploits, we can take no notice. We choose rather to reserve a space for the discovery of what the Arabs believed to be the very head of Nimrod himself, the founder of the Assyrian empire. When this interesting object came into view, Dr. Layard was not present. On his way to the ruins where his men were at work, he met two Arabs riding at full speed, who, on seeing him, suddenly stopped, and looking, half-serious and half-frightened in his face, exclaimed—"Hasten, O Bey! hasten to the diggers, for they have found Nimrod himself. Wallah! it is wonderful, but it is true. We have seen him

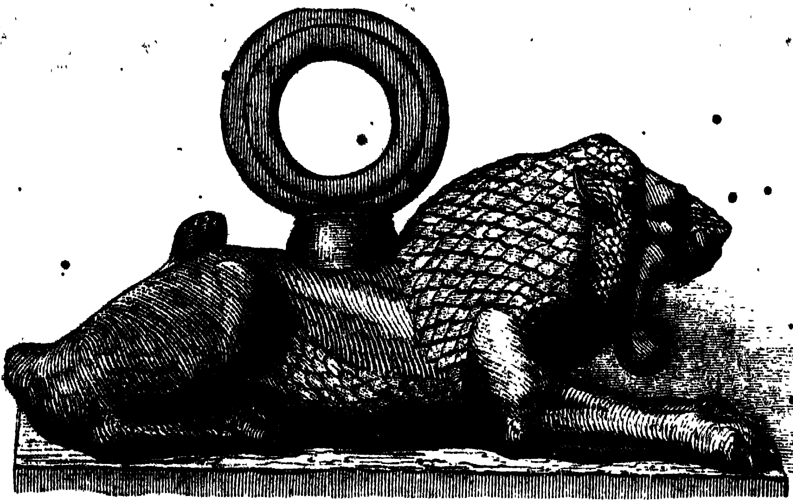

Fig. 11. LION IN BRONZE.—(*See page* 151.)

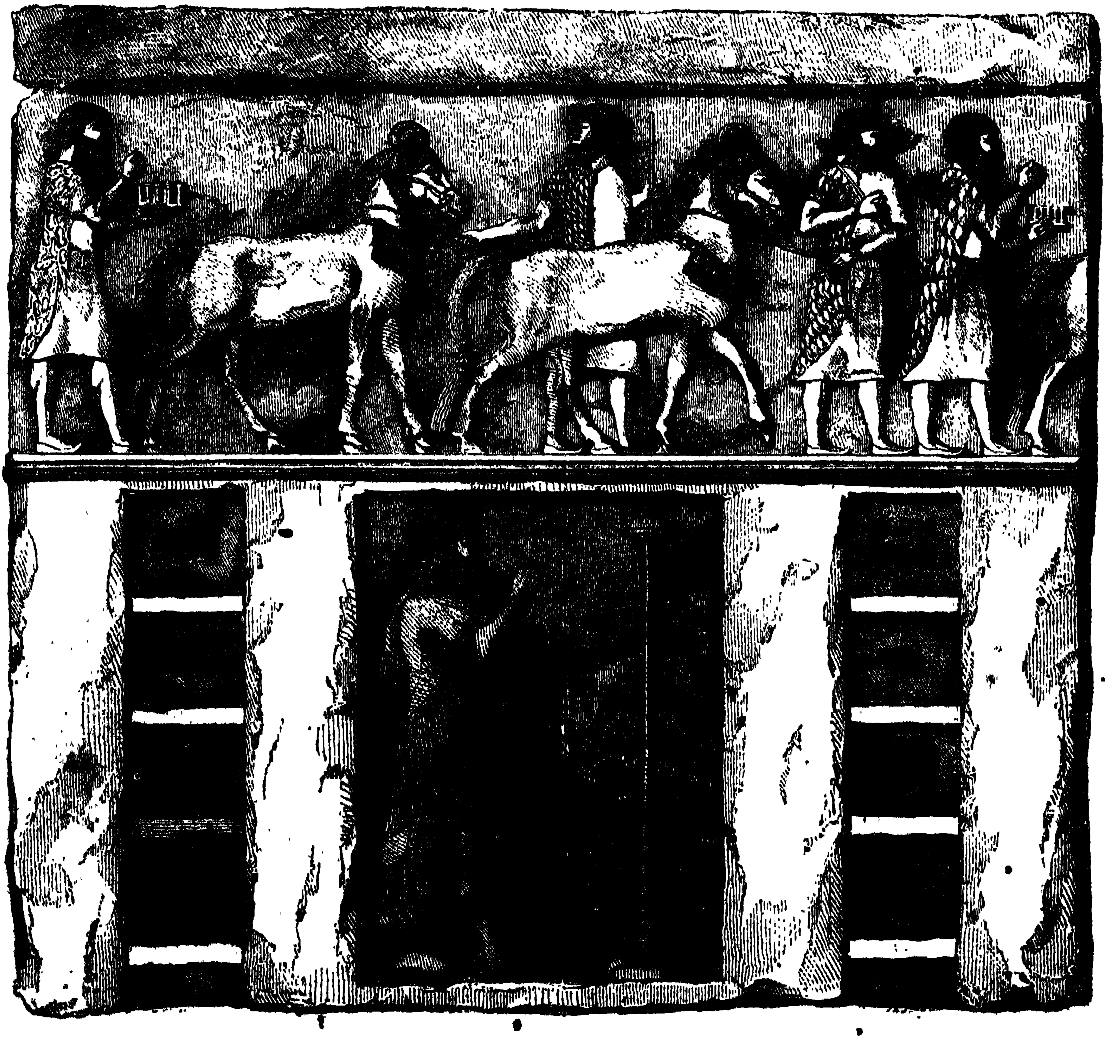

Fig. 12. TABLET, FROM THE ASSYRIAN MUSEUM AT THE LOUVRE.—(*See page* 154.)

with our eyes. There is no God but God!" And so saying they galloped off to their tents. On reaching the ruins, and examining the head, he was convinced that it belonged to a winged lion or bull. It was in admirable preservation, and the outline of the features showed a freedom and knowledge of art scarcely to be looked for in works of so remote a period. His account of the scene connected with this discovery is worthy of insertion. He says:—"I was not surprised that the Arabs had been amazed and terrified at this apparition. It required no stretch of imagination to conjure up the most strange fancies. This gigantic head, blanched with age, thus rising from the bowels of the earth, might well have belonged to one of those fearful beings which are pictured in the traditions of the country as appearing to mortals, slowly ascending from the regions below. One of the workmen, on catching the first glimpse of the monster, had thrown down his basket, and run off towards Mosul as fast as his legs could carry him." Very soon the sheikh, followed by half his tribe, appeared on the edge of the trench; but "it was some time before he could be prevailed upon to descend into the pit, and convince himself that the image which he saw was of stone. 'This is not the work of men's hands,' he exclaimed, 'but of those infidel giants of whom the Prophet—peace be with him!—has said, that they were taller than the highest date trees; this is one of the idols which Noah—peace be with him!—cursed before the flood!' In this opinion, the result of a careful examination, all the bystanders concurred."

Of these magnificent and colossal figures some idea may be formed from the illustration (Fig. 10). The slab from which the design is taken belongs to the splendid collection of M. Botta, and is included in the Assyrian Museum lately founded in the Louvre at Paris. It was taken from the palace of Khorsabad in the year 1844, and therefore before Layard had commenced his excavations at Nimroud. These splendid bulls, with a human head like the human-headed lions, were used in the construction of imposing entrances into the palace, and may be regarded as one of the characteristic traits of Assyrian and Persian architecture. It was with inconceivable difficulty that the illustrious Frenchman got such specimens preserved and removed. The most difficult to remove were the most interesting and the most valuable. Happily, they reached Paris in the month of February, 1847, without accident, and are now accessible to the whole civilised world. Nor these only. Dr. Layard, having made some ineffectual attempts to find the exact site of the ancient Nineveh by an examination of the great mound of Kouyunjik, resumed his excavations in the north-west palace of Nimroud, and entered a hall one hundred and fifty-four feet in length by thirty-three in breadth, in which he found a slab fourteen feet long, cut into a recess, representing two kings standing face to face, with their right hands raised in prayer or adoration. Between them was the sacred tree, above which hovered the emblem of the supreme deity—a human figure with the wings and tail of a bird, enclosed in a circle. The kings appeared to be attired for the performance of some religious service. In another chamber he found eagle-headed deities facing one another, and separated by the sacred tree. In one instance a king stood between those mythic figures, and around whose neck were suspended the five sacred emblems—the sun, a star, a half-moon, a trident, and a horned cap similar to those worn by the human-headed bulls. Another chamber was remarkable for the elaborate and careful finish of its sculptures. The principal figure was that of a king seated on a throne, holding in his right hand a cup, and resting his left upon his knee, and surrounded by his attendants. The whole group designed probably to represent the celebration of some signal victory by the observance of a religious ceremony, in which the presiding divinities of Assyria, or consecrated priests assuming their form, ministered to the monarch. The robes of the king and those of his attendants were covered with the most elaborate designs. In the centre of his breast were represented two princes in acts of adoration before the image of the supreme god. Around were engraved figures of winged deities, and the king performing different religious ceremonies. The throne* was tastefully carved, and adorned with the heads of rams; the legs of the footstool, which may have been of wood or copper inlaid with ivory and other precious materials, or of solid gold, terminated in lions' paws (*see page* 147).

The work of exhumation and discovery having so far been crowned with success, our countryman began to think of sending home some of his accumulated and precious treasure. If M. Botta found the work of exportation the most difficult of his difficulties, Layard painfully learned the same thing. With impaired health, and limited means, and inexperienced workmen, and few facilities, he had no common task to perform. Still he shrunk not from the undertaking. He sawed the slabs containing double bas-reliefs into two pieces, reduced them as much as possible in weight and size, packed and conveyed them from the mound on buffalo carts to the river, where they were placed upon a raft constructed of inflated skins and beams of poplar wood, when they were floated down the Tigris as far as Baghdad, were then transferred to the boats of the country, and reached Busrah for transport to Bombay, and thence to England. The sculptures thus sent home formed the first collection exhibited to the public in the British Museum; and their removal awakened among the Arabs of all classes no little surprise and astonishment. Before being sent off, the Pacha, with all the dignitaries of his household, came to inspect them. Neither he nor his followers knew how to give expression to their feelings. The colossal figures were deemed the idols of the infidels; but some of them protested that they could not be the handiwork of unbelievers, that the infidels could not make anything like them, that they were the production of the magi, and that they were being sent to England to form a gateway to the palace of her queen!

The state of his health compelling him to give up for a time his labours at Nimroud, we find that Dr. Layard took a journey to the Tiyarn mountains. On his way he visited Khorsabad, as the scene of the successful labours of his friend and fellow-worker, M. Botta, whose fame had spread over Europe. He found that the excavations had been carried on as at Nimroud; that the general plan of the building corresponded, only the passages were more narrow, and the chambers inferior in size, that the sculptured slabs exceeded in height, and that the relief of the larger figures had a bolder and more impressive character. It appears that, since the time M. Botta had left the interesting spot, the sides of the trenches had fallen in, and filled up the greater part of the chambers; that the influence of external agencies had become visible in the perishing sculptures; and that shortly nothing could be left of this remarkable monument. At the foot of the mound lay the ruins of a sacred shrine—a tripod or altar corresponding to that now in the Louvre. In fact, the religious idea seems to have been embodied by the Assyrians in all their works of art. It comes out in the representations of their sieges, battles, conquests, festivals, sports, and social customs. We may therefore suppose that they were an eminently religious people, though their religion took on the character of superstition and idolatry. Sacred rites were connected with all which they did or achieved, as the lower tablet (Fig. 12), taken from M. Botta's collection, will strikingly show.

The upper part of the representation shows you four soldiers, perhaps tributaries or prisoners, leading some beautiful and spirited horses. The one at the head of the procession has a long beard, and his dress consists of a short tunic, fastened by a girdle, from which hangs a sort of little pocket or satchel; his shoulders are covered with a lion's skin; his legs are enveloped in spatterdashes, laced in the front, and his feet in a kind of curved clog. He holds in his left hand a model of a town, with its walls indented. Rather, is it not a mural crown, or some symbol corresponding with the modern usage of carrying the keys of a place to the besieger? With his right hand he makes a motion or gesture in token of his submission. The other three are attired in the same manner, only the last has a leopard's skin falling from his shoulders. He assumes the same attitude as the first, and also carries in his hand the model of a town, or symbol of surrender. The plume which surmounts the heads of the horses, the four rows of tassels with which their chest is ornamented, the bridles, and the handle of the lances, are all of a rouge or red colour. Beneath the relief is an inscription in the cuneiform character, which is believed to be nothing more than the name of Medes, with the loyal legend:—"Sargon, the great king—the king all-powerful—the king of kings of the country of Asshur."

The lower division of the design represents a priest in basalt. In addition to his long beard, his hair is curled, and flows in ringlets. The short tunic with which he is invested is ornamented with lace and tassels, and concealed in part under a stola, or sort of trailing or sweeping robe, which passes under the left shoulder, crosses the chest in a diagonal form, leaving the right shoulder uncovered, and opens in the front. The feet are fitted with sandals. His right hand is uplifted in token of invocation, and from his left hand hangs a branch of poppy with three capsules.

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* The cut in page 147 is from the collection of M. Botta. The one found by Layard was a mere stool, without any back, but very elegant.

Before him is a plant which resembles a kind of agave. From the stalk there come out several branches in flower, and the root is adorned with large leaves, which turn over and present the appearance of a fleur-de-lis. It is a beautiful specimen of art, and shows how impressively the idea of the mind can be conveyed to inanimate matter, and that matter become a testimony to the latest ages of the truth of history.

Subsequent to the arrival of Dr. Layard's collection in England, the British Museum obtained a grant of money to carry on the researches which had been commenced at Nimroud and elsewhere. The grant was wholly inadequate to the magnitude of the undertaking. But that the nation might possess as extensive and complete a collection of Assyrian antiquities as it was possible to collect, our disinterested countryman accepted the charge of superintending the excavations. Having made all necessary preparations, he resumed his labours at Nimroud. Sculptures of the highest interest came into view. One represented the king, with his warriors, engaged in battle under the walls of a hostile castle, with the emblem of the supreme divinity hovering over the head of the monarch. Another exhibited the triumphal procession, with the castle and pavilion of the victorious king. In a third, the eagles hovered above the victims, and were feeding on the slain. The horses, for which Assyria was celebrated, were of the noblest breed, while their harness and trappings were remarkable for their richness and their elegance, their graceful plumes and fanciful crests, ornamented with long ribands or streamers, as may be inferred from the bas-relief (Fig. 7), in which a man is seen leading four of these noble animals. In a fourth slab, the king was in the act of receiving prisoners, and then crossing the river with his army. Battle-scenes and human figures abounded in every department.

A monument in black marble was uncovered, which proved to be an obelisk, about six feet six inches in height, lying on its side, ten feet below the surface; on each side of it were five bas-reliefs, and above, below, and between them, was carved a long inscription of two hundred and ten lines. The king was twice represented followed by his attendants; a prisoner was at his feet, and his ministers and eunuchs were introducing captives and tributaries carrying vases, shawls, bundles of rare wood, elephants' tusks, and other offerings. From the animals pourtrayed—the elephant, the rhinoceros, the Bactrian camel, the wild bull, and several kinds of monkeys, all led by the prisoners

it is conjectured, that the obelisk was sculptured to commemorate the conquest of nations far to the east of Assyria, on the confines of the Indian peninsula. The whole column was in the best preservation. A dragon with an eagle's head and the claws of a bird—a monster with the head of a lion, the body of a man, and the feet of a bird, in the act of raising a sword—couching sphinxes, which were probably used as altars, and other objects of interest, were found in the south-west corner of the mound. Tombs with skeletons, either in part or entire, were discovered in the south-east corner. In the north-west palace, which is considered the most ancient building, the bas-reliefs excelled all those that had yet been discovered, in the elegance and finish of the ornaments, and in the spirited delineations of the figures. The colossal image of a female with four wings, carrying a garland, was discovered, as also a fine bas-relief of the king leaning on a wand or staff. There were also numerous winged forms, and tablets of ivory, and vessels of various shapes.

In the central palace the subjects were principally battle-pieces and sieges—cities represented as standing in a river, in the midst of groves of date-trees—and amongst the conquered people were warriors mounted on camels; battering-rams, rolled up against the walls of the town besieged; shields, helmets, and other portions of mail; conquerors carrying away the spoil; the king receiving prisoners, with their arms bound behind them; eunuchs registering the heads of the enemy, laid at their feet by the conquerors; and captive women, in a cart drawn by oxen. In the south-west palace the following interesting bas-relief was discovered:—"A king seated on his throne, receiving his vizier or minister, and surrounded by his attendants, within the walls of a castle; a warrior wearing a crested helmet on a rearing horse, asking quarter of Assyrian horsemen; a spearman on horseback, hunting the wild bull; the king of the north-west palace in his chariot, fighting with the enemy; the siege of a castle;" a prince placing his foot on the neck of a captive, and raising his spear in his right hand, with a procession of warriors carrying away the idols of a conquered nation, and a tablet recording the conquest of some monarch, whose name occurs in no other ruins yet discovered, and to whom no place can yet be assigned in the Assyrian royal lists.

Dr. Layard is of opinion that the existing ruins show that Nineveh acquired its greatest extent and prosperity in the times of the kings mentioned in Scripture, and at which period it was visited by the divinely-commissioned prophet; that the edifices, of which the remains are found at Nimroud, Kouyunjik, and Khorsabad, formed at one time part of the same great city; that each of these palace-temples was probably the centre of a separate quarter, built at a different time, and having a different name; that an interval of several centuries must have intervened between the erection of the different palaces; that this is proved by the fact that the south-west palace was built of materials taken from the north-west palace, that the remarkable differences in the costume of the kings, the forms of the chariots, the trappings of the horses, and the arms and armour of the warriors, seem to indicate that a new dynasty had ejected the older family; that the greater antiquity of the Nimroud ruins is evident from the fact, that the name of the king who built the palace of Khorsabad was found cut above the original inscription; that in a genealogical series of three kings, the name of the first nearly resembled that of the builder of the north-west palace, that of his father was identical with the name engraved on the bricks found in the ruins opposite to Mosul, and that of his grandfather with the name of the founder of Khorsabad;—that this discovery connects the latest palace at Nimroud with the two other Assyrian edifices;—that the discovery of tombs over some of the ruins proves that the Assyrian edifices were overthrown and buried at a very remote period; and yet it is impossible to determine what antiquity belongs to the buildings beneath these tombs, or to say at what period these tombs were erected, or what race then occupied the country;—that the great mound of Nimroud had never been opened, nor its contents carried away since the destruction of the latest palace;—that there are no remains either at Kouyunjik or Khorsabad of the same early period as those at Nimroud, and that Nimroud represents the original site of Nineveh. "The son of the builder of the oldest palace founded a new edifice at Baushiekhah. At a much later period, subsequent monarchs erected their temple-palaces at Khorsabad and Kouyunjik. Their descendants returned to Nimroud, the principal buildings of which had been allowed to fall to decay, and were probably already concealed by a mass of ruins and rubbish. The city had now attained the dimensions assigned to it by the Greek geographers and by the Sacred Writings. The numerous royal residences, surrounded by gardens and parks, and enclosed by fortified walls, each being a distinct quarter known by a different name, formed together the great city of Nineveh."

We wonder not that, on emerging from these underground ruins, and looking around in vain from the naked platform for any traces of the wonderful remains which he had seen beneath, our countryman was half inclined to believe that he had dreamed a dream, or had been listening to some tale of Eastern romance; nor can it surprise us if some one who may hereafter visit these ruins, when the grass has again grown upon them, may fancy that the whole was nothing more than a vision.

Since writing the above article, another collection of these remains has arrived in England. The public papers report also that Mr. Layard has accepted office in connexion with the Government as Under-Secretary of State for Foreign Affairs. This must be regarded as a just tribute to distinguish merit. Some have regretted this appointment, as it would prevent him from continuing his interesting and instructive researches amid the ruins of the Assyrian empire. The changes which have just taken place in the administration of the affairs of the country may, however, leave him again at liberty to renew those researches. Be that as it may, we acknowledge with gratitude that he has done enough to confirm the testimony of Scripture, to silence the objections of the infidel, to confer an invaluable boon upon his nation, and to read the most impressive lessons to man in all future time.

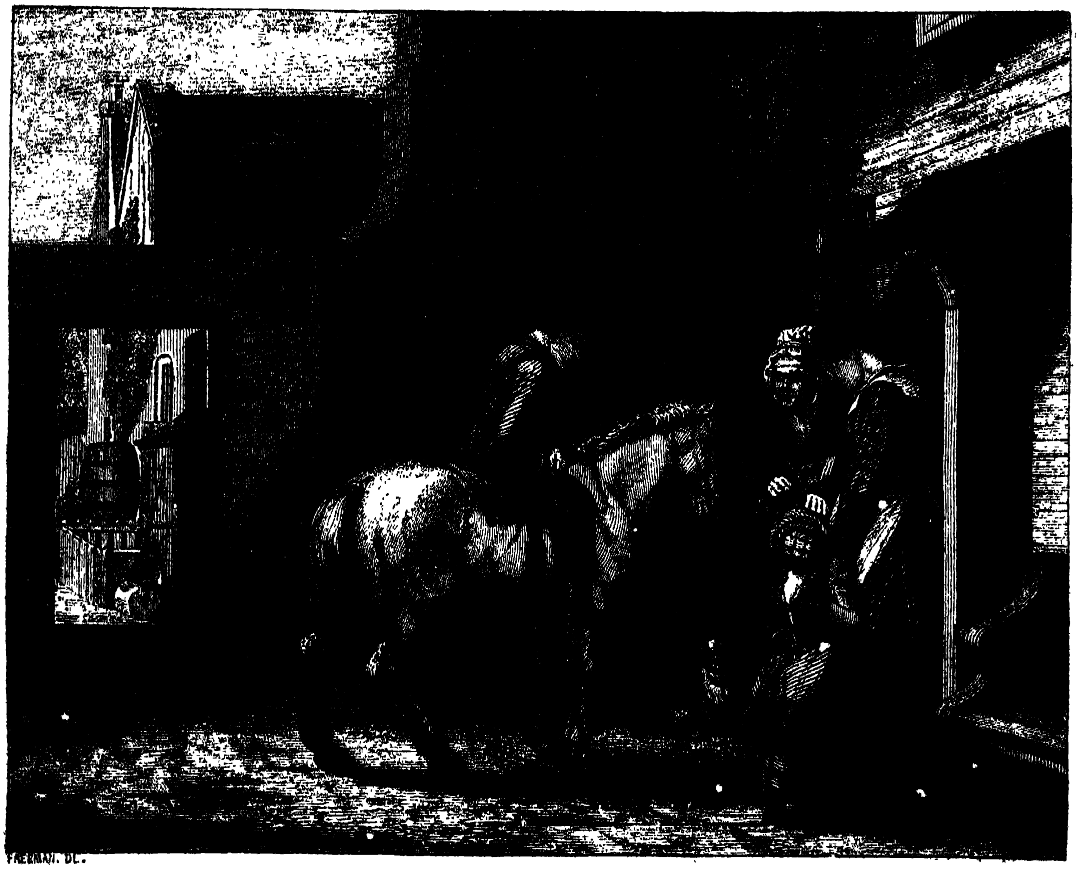
THE YOUNG POSTBOY.

THE old postman is dead, and his son is now about to take his place; to journey from the village to the town carrying the letters and parcels, bringing the news from house to house—who is dead, who has got married, who has lost his wife, who has got a new lease—that Peter Jones has sold his cow, or that Dick Jonson's house is for sale. He is the newspaper of the place, and bears good and evil tidings with equal indifference. And the poor boy is now about to begin his dead father's occupation. The old pony stands with saddle-cloth and halter at the door. His grandmother is placing in a basket the provisions which must serve him until his return. A thousand misgivings and anxieties gather round her heart, and at last rise to her lips; she thinks of the pleurisy which carried off his father, of the damp mists of the morning and the evening chill, of the pony's skittishness. She fears it may throw him in the flooded river, or that the farmers' dogs may frighten it. Ah! and the public-house—a danger more terrible than all—rises up before her; the public-house set at the entrance to the town, like a trap for the unwary, with its gaudy windows, begrimed walls, flaming lights, and brutal revelry. Other perils may threaten his life or limbs, but this assails first his purse, and then his health, and last of all leaves a "damned spot" on his soul. And, alas! for the poor old woman, her fears are not altogether unfounded. For the first time, the young face towards which her anxious and inquiring looks are directed seems not to wear its former expression of ingenuous honesty. Money soils the hands that touch it. There is temptation in its glitter, and evil promptings in its chink. What a host of devils dance around it!—vanity, gluttony, jollity, bad company, drink, dishonesty, ruin. The lad gropes in his pocket with an uncertain hand, and hesitates sadly as he gives an account of his last day's receipts; and the poor old woman reluctantly notices the embarrassment depicted on his countenance.

"You're come of a good stock, my boy," she seems to say. "Your father, and grandfather, and great-grandfather—poor old man! I think I see him still sitting in the arm-chair by the fire—they were all poor and hard-working, but they were honest. Not one of the breed, son or daughter, ever left a stain on our good name. There's not one in the country who wouldn't have given your father a purse full of money to carry for them, without ever counting it, or have put his daughter under his care on the darkest night that ever fell—that wouldn't entrust to him the key of his house, or his cellar, or his drawer; and you're his son—the son of honest John Matthews."

The daughter-in-law listens in silence to what the old woman says, and hope for the future is still mingled with regret for her departed husband. But what if her son, the hope of her life should become a disgrace and torment!

Wilkie, above all men, had the art of telling a tale, be it of joy or sorrow, by looks and gestures. All that we have here written we can read from his canvas as plainly as if it were printed. That overwhelming depths of sorrow, purest joy, proudest love, and highest hope, may be expressed by the glance of an eye, is a fact which has furnished a theme to many a poet; but the highest triumph of art is to transfer speechless woe, or shame or grief, or merriment, to the mute canvas, and bid colour, light, and shade, tell their own tale in forms of unfading beauty. Painting has not always been employed in the service of morality and religion; but these triumphs of the greatest of our artists prove that it is possible to make art at the same time subservient to the claims of ideal beauty, and to purposes of practical utility. This is the more important and the more gratifying, because we know that what is presented to the eye always makes a stronger impression than the most eloquent homily spoken in the ear. A painting which points a moral well may remain before the mind's eye many a year after "a wise saw or modern instance" has escaped the memory. And this is the secret of the people's love for "illustrations."



THE YOUNG POSTBOY. FROM A DRAWING BY WILKIE.

THE SWANS.

PRE-EMINENT for grace and elegance among the varied order of the swimming-birds are the Swans. The one known in our island, and the adjacent parts of the Continent, is alike conspicuous for the beauty of its form and the elegance of its attitudes. As we observe it gliding over its congenial element, we are disposed to exclaim with Wordsworth :—

> "Behold! the mantling spirit of reserve
> Fashions his neck into a goodly curve
> An arch thrown back between luxuriant wings
> Of whitest garniture, like fir-tree boughs,
> To which, on some unruffled morning, clings
> A dusky weight of Winter's purest snows!"

This noble bird is known only to us in a state more or less completely domesticated. The nest, consisting of a large mass of reeds, rushes, and other coarse herbage, is found on the ground near the edge of the water, and an island is generally chosen rather than a bank. The female produces six or seven eggs; these are of a dull greenish white; they are four inches in length, and rather more than two inches in breadth.

"Living on the banks of the Thames," says Mr. Jesse, "I have often been pleased with seeing the care taken of the young swans by the parent birds. Where the stream is strong the old swan will sink herself sufficiently low to bring her back on a level with the water, when the cygnets will get upon it, and in this manner are conveyed to the other side of the river, or into stiller water. Each family of swans on the river has its own district; and if the limits of that district are encroached upon by other swans, a pursuit immediately takes place, and the intruders are driven away. Except in this instance, they appear to live in a state of the most perfect harmony. The male is very attentive to the female, assists in making the nest, and when a sudden rise of the river takes place, joins her with great assiduity in raising the nest sufficiently high to prevent the eggs being chilled by the action of the water, though sometimes its rise is so rapid that the whole nest is washed away and destroyed."

BLACK-NECKED SWANS IN THE GARDENS OF THE ZOOLOGICAL SOCIETY.

The swan is a royal bird, and often figured in the princely pleasures of the former sovereigns of England. In the time of Edward IV. no one was permitted to keep swans who did not possess a freehold of at least five marks yearly value, with the exception of the king's son; and by an act of Henry VII., persons convicted of taking their eggs were liable to a year's imprisonment, and a fine at the will of the sovereign. For ages, the Corporation of the City of London were accustomed, annually, to visit the swans on the Thames—a practice commonly called Swan-*hopping*." This name is a corruption of the phraseology in use, of "Swan-*upping*;" denoting the duties of the official visitors, which was to "take up" the swans that they might be marked. In proof of their estimation in former times, a rare and valuable quarto tract, printed in 1570, mentions the "*upping* daies"—declares what persons shall "*up* no swannes"—and speaks of a court no longer generally known—"the King's Majesties Justices of Sessions of Swans."

The sign of one of our old city inns, "The Swan with Two Necks," arose out of a practice of those times. According to the swan laws, every one belonging to the king was marked with two *nicks* or notches; and the original sign was the royal bird so marked, that is to say, with two *nicks*. In process of time, by some mistake, the two nicks were called two necks; and the error has been perpetuated to our own day.

Mr. Grouvelle states, that when a severe frost threatens to usurp their domain, the swans congregate and dash the water with their wings fully extended, making a noise which is heard very far, and which, whether in the night or the day, is louder in proportion as the frost becomes more intense. In former times the swan was served up at every great feast; and the late Bishop of Norwich, then President of the Linnæan Society, favoured Mr. Yarrell with the following particulars of a practice in that city, in reference to the feeding the young swans of the year for the table:—The town-clerk sends a note from the Town-hall to the public swan-herd, the corporation, and others, who have swans and swan-rights. On the second Monday in August, when collected in a small stream or pond, the number annually varying from fifty to seventy, and many of them belonging to private individuals, they begin to feed immediately, being provided with as much barley as they can eat, and are usually ready for killing early in November. A printed copy of the following lines is usually sent with each bird:—

TO ROAST A SWAN.

Take three pounds of beef, beat fine in a mortar,
Put it into the swan—that is, when you've caught her;
Some pepper, salt, mace, some nutmeg, an onion,
Will heighten the flavour in gourmand's opinion.
Then tie it up tight with a small piece of tape,
That the gravy and other things may not escape.
A meal paste, rather stiff, should be laid on the breast,
And some whited brown paper should cover the rest.
Fifteen minutes, at least, ere the swan you take down,
Pull the paste off the bird, that the breast may get brown."

THE GRAVY.

To a gravy of beef, good and strong I opine,
You'll be right if you add half a pint of port wine,
Pour this through the swan, yes, quite through the belly,
Then serve the whole up with some hot currant jelly.

N.B. The swan must not be skinned.

The voice of the swan is low, soft, and murmuring, and when heard from multitudes congregated together has a very pleasing effect. To it Shakspeare repeatedly alludes. Thus, while Bassanio deliberates on the caskets, Portia says:

> "Let music sound while he doth make his choice:
> Then if he lose, he makes a swan-like end—
> Fading in music."

And after Othello has slain his innocent bride, Emilia exclaims, while her heart is breaking,

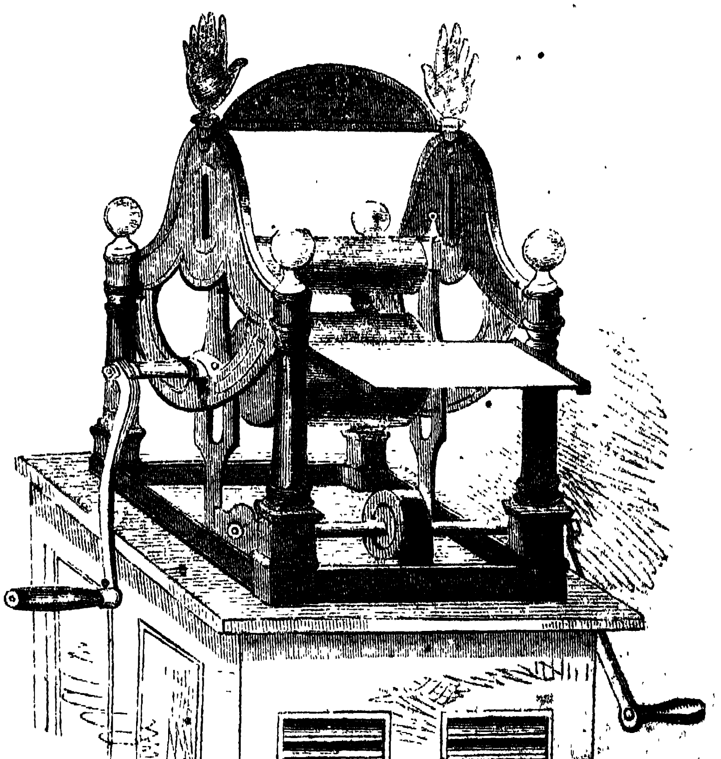
> "Hark! canst thou hear me? I will play the swan,
> And die in music—Willow, willow, willow."

The Hooper, or whistling swan, is a winter visitor to the British islands, even to the southern parts, arriving in flocks, sometimes as late as Christmas, and they are generally more numerous as the weather becomes more severe. The Rev. Mr. Low says:—"The wild swan is found in all seasons in Orkney; a few pairs build in the holms of the loch of Stenness. These, however, are nothing to the flocks that visit us in October from the more northern climates—their summer retreats. Part of these continue with us all the winter, and the rest go to Caithness and the other northern shores of Scotland; in April they go again to the northward, except the few which remain here for the summer. Like the wild geese, these birds fly in the fashion of a wedge, making a few melodious clangs, which has, perhaps, furnished one occasion to give a musical voice to this bird." These birds visit Holland, France, Provence, and Italy; and it is said they sometimes go as far south as Egypt and Barbary.

Several years ago some hoopers were in the possession of the late Earl of Egremont at Petworth, where they are said to have produced their young. The note of one of them, a very old and large male, is described as resembling the sound of the word "hoop;" he repeated it loudly ten or twelve times in succession. Mr. Yarrell states that a pair of hoopers bred on one of the islands in the gardens of the Zoological Society, in the summer of 1839, and that a curious circumstance occurred at that time, in reference to the brood. The cygnets, when only a few days old, were sunning themselves on the margin of one of the islands, close to the deep water. The parent birds were swimming near. A carrion crow made a descent, and struck at one of the cygnets; the old male hooper came to the rescue in an instant, seized the crow with his beak, pulled him into the water, and in spite of all his buffetings and resistance, held him there till he was dead.

A very beautiful species of the swan is found in Chili, the Falkland Islands, the River Plate, and other parts of South America. It is distinguished by a black neck, which finely contrasts with the snowy whiteness of the rest of its plumage. The bill is red, and the legs flesh colour. The engraving exhibits two of them lately bequeathed by the Earl of Derby, from his celebrated collection at Knowsley, to the Zoological Society of London, of which his lordship was the president. The society now possesses four examples of the black-necked swan. One other pair only exist in Europe, and are in her Majesty's collection at Buckingham Palace.

SENECHAL'S GLOVE-CUTTING MACHINE.



GLOVES in our day and in our climate may be considered almost as necessary a part of our clothing as hats and boots; and that they should subserve the purposes for which they are designed—to provide warmth in winter, and coolness in summer—it is necessary not only that they should be made of the most suitable materials, but they should *fit well*—a desideratum not much considered in the days of our ancestors. Of the antiquity of these coverings for the hands there can be little doubt, for the very word "glof" is Anglo-Saxon. Though not mentioned in Scripture, there is no question but that they were worn by the Romans in the time of Pliny the younger; and Xenophon tells us that their use among the Persians was considered a proof of wealth and luxury. Like many other parts of our dress, gloves have had their symbolical meanings. The hand, in the old Germanic law, was the symbol of power, and from the hand to the glove was an easy transition. Thus, probably, arose the practice of throwing down the knightly gauntlet as a challenge—a practice still forming part of our coronation ceremony. The custom of presenting a pair of white gloves to the judge at a maiden assize—an eve[illegible] no very common occurrence in this country [illegible] be regarded as a token of the absence [illegible] in that district. It has also been sugges[illegible]at the white gloves referred, originally, to the [illegible] or pure hand of justice; and it appears, according to a distich in Clavell's "Recantation of an Ill-led Life"—London, 1634—

> "Those pardoned men, who taste their princes' loves,
> (As married to new life) do give new gloves"—

that it was customary for the pardoned prisoner to present the judge with a pair of gloves. Again, the old Spanish proverb tells us that "white hands never offend"—an adage which may have originally suggested the practice.

Gloves have been, time out of mind, the recognisable symbols of good faith and courtesy. "Master Prynne," in his visit to Archbishop Laud, in the Tower, in May, 1643, is said to have accepted "a few pair of gloves upon the Archbishop's extraordinary pressing importunity;" and even to this day it is no less customary to present to each of the followers at a funeral a pair of black gloves than to give white ones and "favours" to the wedding guests. Gloves are not worn before royalty, and judges were prohibited, in ancient times, from wearing gloves on the bench.

But to get off our antiquarian hobby, and to return to our subject, the Glove-Cutting Machine. Economy of production has induced glove-manufacturers to cut them by machinery, though, to produce "a good fit," the London glove makers consider that those cut out by hand are the best. Of course we are referring only to leather gloves. The instrument, of which we

THE FOUR AGES; FROM DESIGNS BY T. JOHANNOT.

I.—INFANCY.

Simonides, the first of the Greeks who wrote a satire, was the inventor of the fable which represents Jupiter as having, after the creation of the world, distributed amongst all the animals those qualities which were necessary for their sustenance and safety. The lion he made bloodthirsty, but courageous; the hare timid, but swift of foot; and the fox weak and comparatively slow, but cunning. Having bestowed something good upon all, man he made the repository of all those vices or failings which had been *divided* amongst the other members of the animal kingdom. To him he gave the cruelty of the tiger, the cowardice of the hare, the deceit of the fox, and the sloth of the ass, and not one redeeming trait was to be found in this great mass of deformity.

This hideous picture was without doubt sketched in a spirit of coarse misanthropy. The few lines of truth it may contain are lost sight of in the overdrawn details of the surrounding monstrosities. And even in this churlish mood the poet has unconsciously acknowledged the greatness of the human heart, when he declares that it can contain so many vices. But the fable, hideous as it may seem, is not without its moral. Let us be ever so sensitive to any slights thrown upon the dignity of human nature, we cannot deny that man's position on his entry into the world has furnished at least some groundwork for the poet's fancy. His existence for the first few months of his life is purely animal. What there is within him of spirit and intellect is still latent and undeveloped. Animal wants are the only signs of life which the young infant gives, and the interval during which they cease to annoy is passed in dreamless sleep. The future lord of the creation comes on earth more helpless, less active, and with less adaptability to surrounding circumstances than the beasts that perish. He sees without recognising or remembering, and hears without understanding. At this stage all is material; and the after progress is but the increasing manifestation of the spiritual growth which is going on within.

From the remotest ages of antiquity, a comparison has been drawn between the life of man and the seasons of the year. The spring, the infancy, boyhood, and youth; the summer, the prime and vigour of manhood; the autumn, the slow decay; and the winter, "the labour and sorrow" and departure. The simile was originally beautiful; but is now so hacknied that it has lost its charm, but its truthfulness is nothing the less. It may inspire mournful reflections, but to many it may call up joyous recollections. Its worst aspect appears when we push it beyond the single rolling year. Spring and summer, autumn and winter, recur in the natural world in *one* unvarying cycle—

> "But when will spring visit the mouldering urn,
> Oh when will it dawn on the night of the tomb!"

As Time, the "pitiless monster," hurries us on with remorseless goad, who amongst us does not cast longing, lingering looks, towards the spring-time of life, when the period of squalling helplessness being passed, the faculties began to awaken, and everything in the world looked fresh. At no period of man's existence is he so powerfully impressed by strength, or magnitude, or distance, or height, or depth, or speed, or splendour. Having no previous experience of any kind whatever, and, consequently, no ground on which to institute comparisons, everything around him appears to the infant, in some sort, the type of the class of objects to which it belongs. The house in which he has been born, and the garden in which he has been accustomed to play, are the world, and all beyond the horizon is unknown space. His father is, of necessity, the strongest, the wisest, the most learned, and most powerful of men; the authority exercised by him is paramount to all other, and the punishment inflicted by him the highest known to the law; his mother the embodiment of generosity, kindness, goodness, and knowledge; the dog the best of dogs; the horse the strongest and swiftest of horses. Everything around wears the hue of morning ere the freshness of its tints begins to fade before the glowing heat of mid-day. Not having yet learned to lie, the child knows not the unhappiness of doubting, and, unlike the youth, knows nothing of the chagrin of unlearning the early lessons of truthful confidence. His limited experience, strange as it is, is the chief cause of his happiness, for the inexperienced are always sanguine as to the future. Having known no sorrows, he fears none. Never having been disappointed, seeing those around him prepared with every resource for the supply of his most trifling wants; the infant cannot conceive the possibility of their ever failing him. Consequently, needing no thought for the future, his only aim is to enjoy the present hour. A continued round of innocent pleasures, interrupted only by trifling childish griefs, scarcely felt and soon forgotten, fill up the first seven years of our lives. We ever regret that obscure irresponsibility—that freedom from care—those unblighted hopes—and that unclouded future; those careless wanderings in the field when selfishness was scarce a fault, for our very helplessness was a claim upon the kindness and forbearance of all around. But the strongest link which binds us to those early days is the memory of lost friends, who in the after journey of life have fallen around us "like leaves in wintry weather." The thousand winning ways, the smiles, the kisses and the presents of those around us in our infancy, are rarely, if ever, forgotten, and many a grown man starts and shudders as he looks back upon the great chasm of time and sorrow which divides him from those long gone years when he climbed their knees, and was soothed by their caresses.

> "Heu! nescia mens hominumque futuri."

How many would recoil from the dangers of the stormy voyage of life, and cling to that long-lost haven, did they but know the dangers and sorrows that awaited them! and how many, when the gulf has once been crossed, of which, like the fabled Styx, the exile is eternal, stand upon the further shore, and stretch their hands back towards that sunny region with unavailing lamentation! If they had not then the lore of many an age, and ponderous volume, they had had no morns of toil or nights of waking; they may not have had enlarged views, nor expanded intellect, but neither had they their attendant cares and responsibilities; they were not wise, but they were not cold and heartless; they had no experience, but they had not suffered deeply from the consequences of a thousand errors.

By one of those wise and merciful dispensations of Providence, which fix our admiration but defy our scrutiny, and which, at the same time, by the unvarying nature of their operation, excite little attention from the crowd, men are not suddenly snatched from the joys of childhood, and plunged without preparation into the turmoil of life. There is an intermediate process to be undergone, by which the change is brought about by slow degrees, and which is generally known as *education*. But, while under its operation, the unavoidable temptations and allurements of the world—the lust of the flesh, and the lust of the eye, and the pride of life—tear away many of the best and finest impressions of their infancy; so that it is a question whether the knowledge we acquire be not often dearly bought by the loss of pristine purity and truthfulness. Many would, doubtless, reply, "pity 'tis, 'tis true;" but all must acknowledge that the evil is in a great measure unavoidable. But there are some impressions which time, and vice, and turmoil, and adventure can never wear out, for they are graven on our hearts—those left by a mother's earliest lessons. Those who feel the truth of this—and who does not?—will enter at once into the spirit of our engraving, and feel the dearest and tenderest recollections of their lives stealing across their souls like a vision from a better land, where care and sorrow are alike unknown.

There is a mighty spell in sacred memories, a surer defence against the seductions of falsehood, chicanery, and dishonour, than all the wisdom of philosophy, or all the irrascible pride of mere doctrinal belief. If they be but treasured up, they grow with a man's growth, and strengthen with his strength, and become at last a strong tower against the face of his enemies. Many a one has been saved from ruin, has been stimulated to higher efforts, and has felt nobler hopes, and holier aspirations aroused within him, by the still small voice of the teachings of his infancy. We fear to disappoint the expectations formed of us in childhood, and if "the forms of the departed, the beloved, the true-hearted" linger round us, we dare not shrink from the combat. It was a resolution formed in boyhood, on the banks of the Dayle, that sustained the great pro-consul of India through all the vicissitudes of battle and siege, intrigue, violence, and persecution, and brought him at last, true as the magnet to the pole, to lay down his wearied head in the halls of his ancestors. But he had no mother to chasten, purify, and guide that "unconquerable will and courage never to submit or yield," or he might have left his name and memory to foreign nations and the next age, without one stain to damp our admiration of that proud heart and lofty intellect.

It is then not only pleasant, but profitable to dwell upon the dreams, and hopes of childhood.—

> "Not wholly can the heart unlearn
> Those lessons of its better hours,
> Ne'er yet has Time's dull footstep worn
> To common dust that path of flowers.
>
> "Thus while at times before our eyes
> The shadows melt and fall apart,
> And smiling through them round us lies
> The warm light of our morning skies—
> The Indian summer of the heart!
>
> "In secret sympathies of mind,
> In founts of feeling which retain
> Their pure, fresh flow, we yet may find
> Our early dreams not wholly vain."

STATISTICS OF THE COTTON MANUFACTURE OF GREAT BRITAIN.

The cotton manufacture may be said to have been commenced in England about the year 1641, for in that year it is recorded that Manchester "bought cotton wool that comes from Cyprus and Smyrna, and worked the same into cloths, which are sent to London and there sold." By the year 1697 this important branch of our national industry may be said to have taken root.

In the year 1697, we imported into this country 1,976,359 lbs. of raw cotton, or cotton wool. In 1850 we imported 563,576,816 lbs., an amount less than that of 1849, in which year 755,469,012 lbs. were imported. Of the quantity imported in 1850, 493,153,112 lbs. came from the United States, 30,299,982 lbs. from Brazil, 118,872,742 lbs. from the East Indies, 18,931,414 lbs. from Egypt, 228,913 lbs. from the West Indies, and 2,098,698 lbs. from various other parts of the globe: 102,469,696 lbs. of this raw cotton were again exported. The quantity consumed in the manufactures of the United Kingdom in 1850 was 584,200,000 lbs.; in 1849 it was 629,900,900 lbs., the largest amount ever consumed in one year.

In the spinning of this raw cotton into yarn, and weaving the yarn into calico, there were employed, in 1,932 factories, 330,924 people (141,501 males, and 189,423 females), of whom 9,482 were males and 5,511 females under thirteen years of age; 183,912 were females above thirteen years of age; 37,059 were males between thirteen and eighteen years of age, and 94,960 were males above eighteen years of age.

The number of spindles for spinning the yarn was 20,977,017, and the number of power-looms for weaving the calico, 249,627. These spindles and power-looms were kept in motion by the aid of 71,005 horse steam-power and 11,550 horse water-power.

Including the hand-loom weavers, and the vast multitude of persons employed in domestic branches of the cotton manufacture, in calico printing, machine making, or as clerks, packers, overseers, &c. &c., we cannot estimate the whole number of persons at less than 900,000.

The counties in which these cotton factories are situated, are as follows; viz., in *England*—Lancashire, 1,235; Yorkshire, 227; Cheshire, 145; Derbyshire, 74; Nottingham, 19; Middlesex, 17; Cumberland, 11; Stafford, 10; Leicester, 7; Surrey, 3; Norfolk, 2; Warwick, 2; Gloucester, 1 total, 1,753.

In *Scotland*—Lanark, 91, Renfrew, 51; Bute, 4; Dumbarton, 4; Stirling, 4; Ayr, 4; Perth, 3; Aberdeen, 2; Linlithgow, 1; Kircudbright, 1: total, 168.

In *Ireland*—Dublin, 3; Antrim, 3; Armagh, Kildare, Louth, Waterford, and Wexford, each 1. total, 11.

In 1697, the total value of cotton goods exported was £5,915; in 1850 it amounted to £28,257,401. The best customers for our cotton goods are the countries whence we import the raw material.

There are no means of ascertaining the total quantity of cotton goods annually manufactured; we can only obtain correct information as to the quantity of these goods exported. In 1850, we exported 1,358,182,941 yards of plain and printed calicoes, 114,074,971 yards of lace and bobbin net, 4,357,195 lbs. of cotton thread for sewing, 237,828 dozen of cotton stockings, besides various small articles to the value of £235,495, and 131,370,368 lbs. of cotton yarn.

The yarn spun in 1850 would, in a single thread, pass round the globe 407,[illegible] times; it would reach 102 times from the earth to the sun, and encircle the earth's orbit 17 times. The plain and printed calico *exported* (to say nothing of that used at home) would form a girdle for the globe, passing nearly thirty times round the equator.

Some idea of the producing power of machinery may be formed from the consideration of the fact, that to spin the cotton wool, now annually used, into yarn, would require 80,000,000 spinsters constantly working at the one-thread wheel, such as was universally employed prior to the inventions of Wyatt, Arkwright, and Crompton.

In 1850, the cotton manufactures of Great Britain consumed as much raw material as all the chief manufacturing countries of Europe and the United States of America put together. The following may be considered as a correct account of this comparative consumption of raw cotton, in 1850, in the countries specified:—Great Britain, 584,000,000 lbs.; Russia, Germany, Holland, and Belgium, 133,000,000 lbs.; France (including adjacent countries), 142,000,000 lbs.; Spain, 20,000,000 lbs.; countries on the Mediterranean, Egypt, &c., 11,000,000 lbs.; countries bordering on the Adriatic, 45,000,000 lbs.; United States of America, 188,000,000 lbs. Total, 1,123,000,000 lbs.

Since writing the above, the Board of Trade Returns for 1851 have been presented to Parliament, from which we obtain the following statistics of the cotton manufacture in that year. The total quantity of raw cotton imported was 757,379,840 lbs., being the largest quantity ever imported in one year; of this, 596,631,752 lbs. were imported from the United States of America; 122,627,008 lbs. from British India; 19,339,040 lbs. from Brazil; 14,715,904 lbs. from Egypt; and 4,063,136 lbs. from other parts. Of this quantity 111,943,216 lbs. were re-exported to various parts, chiefly to Russia and the continent of Europe.

We next notice the export of our cotton manufactures for 1851; and here we find a very considerable increase on the amount exported in 1850, although that year was far more favourable than any that had ever preceded it.

The following are the particulars of British cotton manufactures exported in 1851:—1,537,904,162 yards of plain and printed calicoes and cotton goods, valued at £22,040,489; 104,947,998 yards of lace and patent net, valued at £561,160; 4,349,288 lbs. of thread for sewing, valued at £452,769; 507,750 dozen pairs of stockings, valued at £197,420; sundry articles of the value of £195,275; and, lastly, 143,958,501 lbs. of cotton-yarn, valued at £6,631,896; forming a sum total of £30,078,999, or more than three-sevenths of the whole exports of the United Kingdom.

The value of manufactured cotton goods imported in 1851 from India and other parts, was £502,869, and of cotton-yarn £103,586; the former of these to the amount of £200,635 were re-exported, and the latter to £91,480.

ASTRONOMICAL STATISTICS.

At the annual public sitting of the members of the French Institute, M. Arago, the Astronomer-Royal of France, in addressing the assembled conclave of the most eminent men of science in France, on the physical constitution of the sun and stars, observed: "It is only within a few years that we have become acquainted with the distance which separates us from the nearest stars. This distance is about 206,000 times that of the sun from our earth—more than 206,000 times 38 millions of leagues!

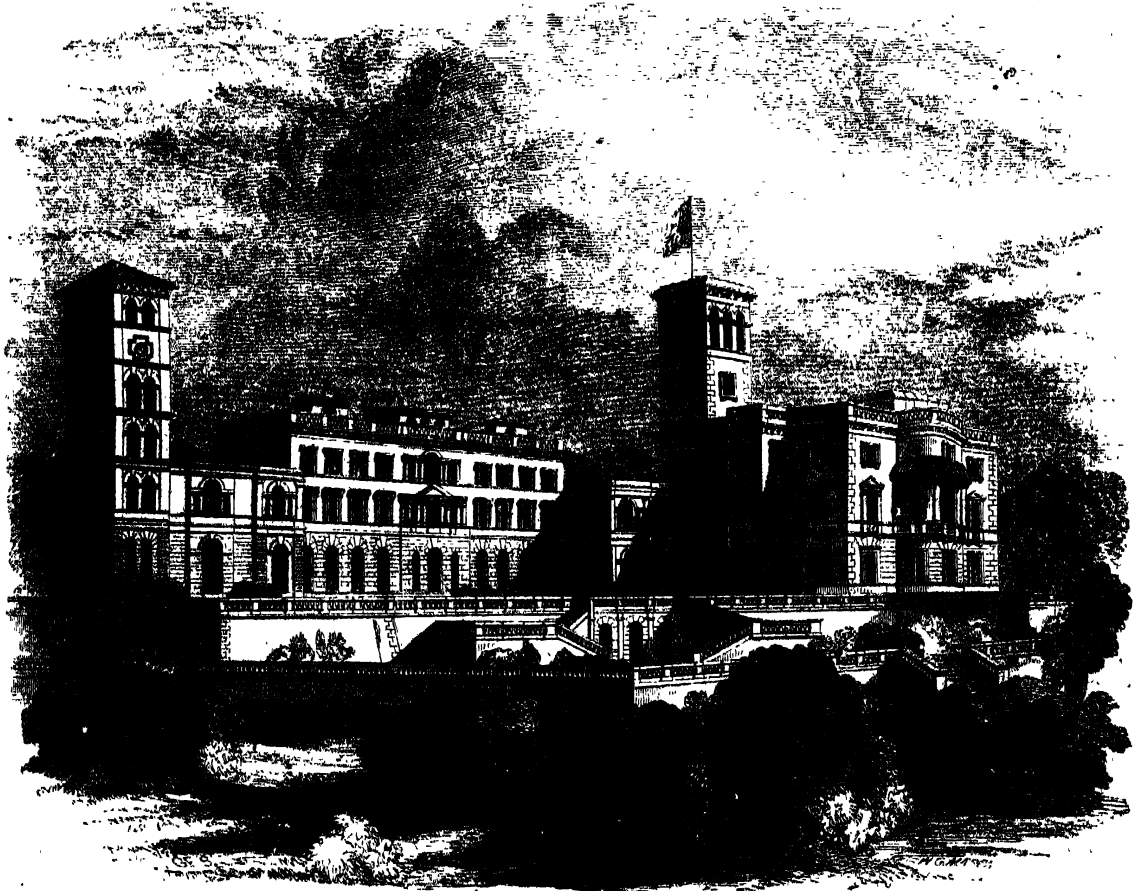
"Alpha, in the constellation of Centaur, is the nearest star to us, the light from which takes three years to arrive at our earth; so that, if Alpha were blotted out of creation, we should not be aware of the fact until three years after its occurrence. When we recall to our recollection the circumstance that light travels 77,000 leagues per second—that a day is composed of 86,400 seconds, and a year of 365 days—the mind becomes bewildered at the contemplation of such immensity. Were the sun, with its broad and ample disc, removed to a distance from us as great as that of the nearest star, it would appear to us, even by the aid of our most powerful glasses, but of very diminutive size, whilst its brightness would be equal only to a star of the third magnitude.

"The number of stars made visible to us by means of our most powerful telescopes, is upwards of 40 millions—40 *millions of suns!*—the distance of the most remote from others being such as to require a period of from 3,000 to 4,000 years for the light to pass from one to the other.

"A photometric (or light-measuring) experiment of Wollaston showed, that it would require the united brilliancy of 20,000 millions of such stars as Sirius—the brightest star in the firmament—to shed a light over our globe equal to that of the sun."

OSBORNE, ISLE OF WIGHT.

Perhaps no royal palace is better known to our countrymen than Osborne. In these days of cheap excursions, there are few who have not seen the national standard waving from its walls, and, on a bright summer day, there are few who have not felt that royalty did well when it chose Osborne for a home. Here, at least, her Majesty may unbend; here, at least, the heart within her may commune with nature. Wood and water, hill and dale, a blue heaven above, and a green earth beneath;—these give Osborne a proud pre-eminence over Buckingham and St. James's palaces, or even over Windsor's royal pile. Like ordinary mortals, royalty needs sea-air; and at Osborne it may be breathed fresh and pure. In one respect Osborne differs from its associate palaces. It has no historic interest attaching to it. The glory or the shame of our other royal residences belongs not to it. Here no great national pageant has been acted—no dark deed has been done. Osborne tells of what palaces seldom are fated to behold—of a domestic life and love as calm and precious as it is rare. To our eyes, then, Osborne has a peculiar charm. We love it as a happy English home. Osborne is rich in that treasure without which life were a bitter failure, and vain and worthless were the pomps of royalty or the jewels of the crown.



THE MARINE RESIDENCE OF HER MAJESTY QUEEN VICTORIA.

What few particulars we can glean of Osborne can soon be told. It is beautifully situated in the neighbourhood of East Cowes. The mansion is placed in a fine park well stocked with timber, and adjoining eastwards the grounds of Norris Castle, the residence of her present Majesty and the Duchess of Kent in the summer of 1831. The views from Osborne are extensive and of varied beauty, though certainly not equal to the prospect from Norris Castle, which latter commands the Southampton water and the roadstead of Cowes, while Osborne takes a more easterly range, including Portsmouth, Spithead, &c., being shut out by the high grounds of Norris from the views to the westward. Very little of the mansion is seen from the high road, but in sailing along the coast, as in the steamers from Ryde to Cowes, the place is seen to great advantage, and appears to be situated at the head of an ample lawn, which slopes gently to a valley open to the sea-beach. The whole park, strictly private, extends down to the sea, with good landing-places. The mansion was in the occupation of Eustace Mann, Esq., during the civil wars between Charles I. and his parliament. There is a copse adjoining, called Money Copse, where the proprietor, it is said, during the wars, buried all his money, plate, &c., and, on searching for it again, it could not be found. According to tradition, the property still remains secreted. If it be so, we trust her Majesty may be so fortunate as to secure the long lost treasure, but, for ourselves, we doubt the story—we know rumour to be such a lying jade. Her Majesty first hired Osborne in 1844. It was then the property of Lady Isabella Blachford, of whom it was ultimately purchased. Then it was very unfit for a royal residence. Since then the place has been completely altered and enlarged. Osborne offers some advantages for Prince Albert in the well-known and highly-popular character of a British farmer. Osborne park and wood, with gardens, contain 846 acres, the whole of which is freehold. The farm adjoining is freehold, and contains 424 acres. Here the Prince pursues agriculture with his accustomed enterprise and skill, and here his birthday is celebrated by the labourers in good old English style. The last time we were at Osborne one of these annual celebrations occurred. It was a great day for Cowes, and on happy hearts looked down a glorious sun. Long may such anniversaries occur. At Osborne we may be sure they are looked forward to with joy, and their memory is held dear.

ELEVATION OF AN ANCIENT KING.

The earliest and most natural mode of government was the patriarchal. In the first ages of the world, before the increase of population, or the extension of arts or commerce, mankind formed but a number of tribes or families, and the oldest member of each was at the same time its ancestor and ruler. This was the mode which prevailed in the days of Abraham, and which has been preserved amongst the Bedouin Arabs; to this, of course, succeeded election, when the population became so numerous and extended that the degrees of affinity could no longer be observed or remembered with accuracy, and the respect paid to seniority was diminished by lapse of time. Of course the rule could never be strictly observed. Force or fraud often gained what a man's virtues or abilities were not sufficient to procure for him, and the merits of a great hero or lawgiver were often imputed to his children or his children's children, so that they were suffered to succeed him merely because he was their father. The people are ever more prone to remember services or favours with gratitude, than to assert their rights with inflexible sternness. In Greece the kings became, in process of time, hereditary, their subjects, however, reserving to themselves the right of deposing them for any breach of their liberties. The first king of Israel was chosen of God, and when He had ceased to interfere in the affairs of the nation, the succession appears in a majority of instances at least to have been allowed to pass in the hereditary line without dispute. The history and crimes of royalty in Rome are doubtless present to the minds of all our readers.

But between all the organisations in which society and states are presented to us in ancient times, and that which prevailed amongst the tribes who overthrew the Roman empire, there was an immense difference. In the former every man was proud of the state or commonwealth to which he belonged—its name, its power, its glory. He and his fellows were nought but cogs in a great wheel. To promote its aggrandizement, he was ready at all times to risk or sacrifice his life and limbs and earthly honour, the safety and comfort of his wife and his family, and the security of his property. Every one was merged in the great mass; standing alone each was but a cipher—nothing by itself, but deriving all its value from the units placed beside it.

Amongst the German tribes the case was widely different. Here the individual was everything, and the tribe or state nothing. No restraint could be placed upon personal liberty except for the gravest offences, and then only by the solemn judgment of the whole of the culprit's peers. The development of this principle naturally fostered the growth of strong wills and strong passion, and their annals are disgraced on every page by the recital of acts of wild and brutal violence. But under the softening and civilizing influence of christianity, it proved itself the surest bulwark of liberty. It may naturally be expected that men so jealous of their freedom would never tolerate the supremacy of a despot. In peace each pretty much followed his own inclination, avenged his own wrongs, and asserted his own rights. The little authority possessed by the chief was seldom, if ever, exercised. He was never regarded as more than the first of a band of equal warriors; and as it was in war that his duties became really onerous, he was generally chosen for the adventitious attributes of physical courage and beauty, or great personal strength. The phrase "elevate to the throne" was then literally correct. The ceremony from which it took its origin has long ago fallen into disuse; but in most European languages, the sentence which stands at the head of our article is still retained as expressive of the succession or election of a monarch to the supreme power of a state. In the Merovingian era, and the old time before it, that long buried but romantic period which Augustin Thierry, the most devoted and enthusiastic of modern historians, has brought so vividly before our eyes, with all the freshness of actuality, the fierce warriors who peopled the forest and valleys of Germany and Gaul chose their chieftains with the barbaric ceremonial represented in our engraving. Amongst the Franks elevation on a shield was one of the essential formalities belonging to the election, and various authorities might be quoted to prove that the custom was equally prevalent amongst all the other tribes. The object of their choice was placed upon an upturned buckler, and carried on the shoulders of four of the stoutest of his followers three times round the assembly, amidst the acclamations of the leudes and ahrimans. Nothing with which we are familiar in modern times can convey to the mind of the reader any vivid idea of these singular but impressive scenes. They always took place in the open plain outside the towns, and generally under the walls of the church. Here the whole of the conquering nation assembled in arms. It was looked upon as a bad omen if the new king did not preserve an upright and easy posture upon the shield during his progress round the circle. The unfortunate Gondovai, the descendant of Clothaire, whom the leudes of the south set up in opposition to Gontran and Childebert, after having preserved his footing during the two first rounds, stumbled in the third, and only saved himself from falling by leaning on the shoulders of his bearers. His followers from that moment despaired of success.'

This custom continued in vogue amongst the Franks down to the reign of Pepin, but from that time it began to disappear, either from the increase of civilization, or more probably under the influence of the clergy, who endeavoured to substitute in favour of the Carlovingians the Judaic ceremony of consecration and anointing. Among the country people, who always cling with tenacity to ancient usages, particularly beyond the Rhine, traces of the old mode of election might be found for centuries afterwards. In Franconia, in the sixteenth century, the peasantry raised in the air three times with loud cries him whom chance had made "King of the pfennig," a piece of money placed in a cake baked by the oldest man in the village on Twelfth Night, like our custom of placing a ring in the pancakes on Shrove Tuesday.

A VISIT TO A SUGAR REFINERY.

If in ordinary company the question were asked, "What is sugar?" how few of us could give anything like a satisfactory reply. To be sure, we most of us know that it is a vegetable extract which comes from the West Indies, and which is used to sweeten our tea and coffee, and pies and puddings, and is often employed to render the medicines we like to give our little ones somewhat less nauseous; but of its modes of preparation or chemical constituents we are, most of us, content to know very little indeed. In this paper it is proposed to briefly review the progress of sugar, from its growth in the cane to its appearance in sparkling white lumps, such as is daily used in domestic life.

Sugar,—in French, *sucre*; in German, *zucker*; in Latin, *saccharum*,—is the sweet constituent of vegetable and animal matter, found almost universally in greater or lesser quantities in every kind of vegetable product. It may be divided, Dr. Ure informs us, into two principal varieties: the first, which occurs in the sugar-cane, the beet-root, and the maple, crystalizes in oblique four-sided prisms, terminated by two-sided summits, and has a sweetening power which may be reckoned as 100; the second occurs ready-formed in ripe grapes, figs, dates, and other fruits, the crystals of which are not what are called *true* crystals; and the sweetening power, as compared with the first, may be represented at 60. Besides these two principal kinds, there are the sugar of milk, manna, mushrooms, liquorice-root, parsnips, and sawdust! but of these, and various other sorts, we need make no further mention. The sugar of commerce, whether extracted from the cane, the beet-root, or the maple, consists of oxygen, carbon, and hydrogen, in about the following proportions, as given by various chemists:—

	Gay Lussac and Shenard.	Berzelius.	Prout.	Ure.	
Oxygen .	50·63	49·856	53·35	50.33	in 100
Carbon . .	42·47	44·069	39·99	43.38	"
Hydrogen	6·90	6·875	6·66	6·29	"

The sugar cane ([illegible] *saccharifera*), is a plant of the graniferous family; and varies in height from eight to ten or even twenty feet. It is about an inch and a half in diameter, with a stem of a green hue, verging to yellow as it approaches to maturity, and divided into annular joints of a whitish yellow colour, about three inches apart. The cane is of a dense and brittle character, decorated with long, flat, straight, pointed leaves, three or four feet in length, which fall off as the plant ripens. It is propagated either by seeds or cuttings, and is found in a wild state in the West India islands and the adjacent continent, and in many parts of the eastern hemisphere. Humboldt asserts that, before the discovery of the New World by the Spaniards, the home of the sugar cane was the interior of Asia, whence it was transplanted into Cyprus, and thence into Sicily. The history of the plant, the product of which is now so well known, may be briefly stated. It is related by Lafitan, that in 1148, William II. king of Sicily made a present to the monastery of St. Benoit of a mill for crushing the cane; and that sugar was known to the first crusaders, who being short of provisions at Acre and Tripoli, were obliged to chew the cane to support life. In 1420, Don Henry, Regent of Portugal, imported sugar into Madeira from Sicily, whence it found its way by an easy transition to the Canaries, from which islands, before the discovery of America, Europe obtained its supply. From the Canaries the sugar cane passed to the Brazils and the West Indian islands; and towards the middle of the seventeenth century, sugar was imported into England from Barbadoes. From this period, a regular supply has been sent from the West Indies, Mexico, Peru, Spanish America, and the French and Dutch colonies. According to Peter Martyr, who wrote the third book of his first Decade during the second expedition of Columbus, the great discoverer of the western world, in 1493–95, either he himself introduced the cultivation of the sugar plant, or found it among the arts practised by the natives of the then unknown land. Into this question we cannot enter; nor, indeed, does it greatly matter to us as we sweeten our tea or coffee, who was the first man to carry the plant to America—especially as we have no possible means of settling the question.

Of the manufacture of sugar from the cane—of which there are several varieties—in the West Indies, we shall be very brief. When the canes are ripe they are cut down close to the ground, and transported in bundles to the mill house, where they are crushed in machines of a very complicated description. Indeed, on the superiority of the machinery employed depends greatly the profit arising from the cultivation of the sugar cane. The crushed cane is then boiled, and the juice, as it comes from the boiler, is collected, clarified, reboiled, cooled, and finally separated from the syrup, or molasses. In its imported state, West India sugar is of a slight brown colour and granulated appearance, the crystal being of a large, broad character. From the West Indies it is imported in hogsheads; while, from other parts, it reaches England in coarse bags of canvas or grass. The latter, after being cleansed, are frequently sold in the streets as matting for the houses of the poor. Great improvements are constantly being made in the manufacture of raw, or brown sugar, though doubtless much remains to be done ere the estate of the West Indian planter becomes as profitable as could be wished. In 1848 there were imported into the United Kingdom upwards of six million hundredweight of unrefined sugar, fully three-fourths of which came from the British possessions in America.

From this brief sketch of the history of sugar—this hop, skip, and a jump over seven centuries—we come at once to the main purpose of our writing, a description of the method of refining raw sugars. And for this purpose we avail ourselves of the kindness of Messrs. Fairrie and Co., the large sugar refiners of the

Commercial-road, Whitechapel, whose establishment we visited for the purpose of this paper.

Those who would know anything of the great manufacturing processes carried on in London must not be afraid of going somewhat out of their accustomed track, or of penetrating dull, dirty, poor-looking neighbourhoods, or be *very* particular about soiling shoes or clothes; if they *are,* they must be content to take their knowledge at secondhand. And we here forewarn all readers, that one personal inspection of a manufactory will teach them more than the most minute and graphic description can possibly do; especially if they happen to be accompanied by so clever and obliging a cicerone as he who went over Messrs. Fairrie's sugar refinery with us.

We make our way, then, to Whitechapel by omnibus, without even stopping to inquire anything of the peculiarities of the neighbourhood—though we have a dim sort of recollection of the place being described by old Strype—who himself was born in a court in Petticoat-lane, then filled with goodly houses and gardens, instead of Jews' clothes-shops and stalls for the sale of old shoes—as "a spacious, fair street for entrance into the city eastward;" and merely glancing in the direction of the driver's whip as he points out George-yard, a dark, filthy entry, and tells us that "down there is Cadger's-hall, the most infamous cheap lodging house in London, filled with thieves and beggars," we dismount at St. Mary's church, a poor, ugly-looking structure with a square white tower facing the street; and, remembering our directions tolerably well, proceed down Church-lane, and turning sharply round, find ourselves in the Commercial-road. And glad enough we are that we have arrived at our destination; for a dirtier, noisier, or less inviting street than that we have passed through eastward from Aldgate pump we scarcely remember to have seen. In the centre is a hay market, which effectually obstructs the way in spite of its width. On the right hand side from the west is a butcher market facing the street, which stinks like a fever hospital; passing which, the road on either side is lined with dirty shops, dirty people, and foul gutters. It is peculiar that in London, in all quarters of the town with scarcely an exception, the road to wealth is through filth and want. And thus we make our way into the sugar refinery aforementioned, the largest of the kind, in a neighbourhood where "sugar bakers" have for centuries abounded. We pause before a pair of dull-looking gates, and, glancing upwards, take mental note of the extreme height of the building—eight storeys at least—the immense number of windows, which appear calculated for anything but admitting light, and the general dinginess of the whole place. We ring the bell, we present our credentials; we look around; and are presently striving to understand all we see about us.

Most of us know the difference between "moist" or "brown," and "loaf" or "lump" sugar, the latter formerly a sort of luxury even among the middle classes. Well, the brown is the sugar as it comes from abroad, and the loaf or white is after it has left the hands of the refiner. All raw sugars, no matter how well made, contain a certain quantity of impurity—from one to about six per cent.; and to separate the pure crystalizable matter from the molasses, colouring matter, and filth, which the former processes left in the sugar, is the principal object of the sugar refiner, or sugar "baker," as he is vulgarly called.

Having lingered somewhat too long at the gate, we must introduce the reader at once into the premises. Here, then, we stand, with our polite conductor, on the ground floor in what is called

THE RECEIVING ROOM.

It is a busy scene, indeed. At the open door-way, men are receiving great hogsheads of raw sugar from the wagons outside, just fresh from the West India Docks, and no sooner is one hoisted out by the crane and tackle, than it is rolled forward among its fellows, five hundred strong, and another takes its place. At the "blow-up" pans men are shovelling in the sugar from hogsheads lying on their sides, surrounded by steam; while near at hand are others engaged in knocking out the heads of casks, or putting the empty ones away. At the other end of the great room, which is low, partly enveloped in steam, and not over light—for folks soon get used to a particular kind of atmosphere—are the vacuum pans and their attendants; above are pipes passing in various directions for carrying steam, syrup, &c., to their various destinations; below, the ground is covered with a dirty, sticky mass of black molasses—dirty, but not lost or valueless: while all around and about are evidences of wealth, and industry, and energy, in many forms. In the shape of full and empty bags and hogsheads; under the guise of men by scores in various *disguises* peculiar to their occupation; in the semblance of pans, and pipes, and odd-shaped vessels, the uses of which we have yet to learn; and in the indescribably sweet odour which pervades the whole building—a scent of hot steam, a scent of baked apples, a scent of a grocer's shop, a scent of a confectioner's laboratory—an indescribable scent, as of all the washerwomen's rooms and hardbake warehouses in London rolled into one.

"Well, but this will never do at all," exclaims some impatient reader; "tell us about the process, without any further circumlocution."

"Soft and gently, my most vivacious friend, there is a time for all things," we reply; "and if the Venetians, to whom the world owe so much, had not in the end of the thirteenth century begun by converting into something presentable—sugar candy it was—the black sugars of the Egyptians, to whom the world owe so much more, we should probably never have occupied your attention about sugar-refining at all. So that, you see, you must blame the Venetians for gossips, and not we." However, we take up the hint so politely given, and turn our attention to

THE BLOW UP PANS

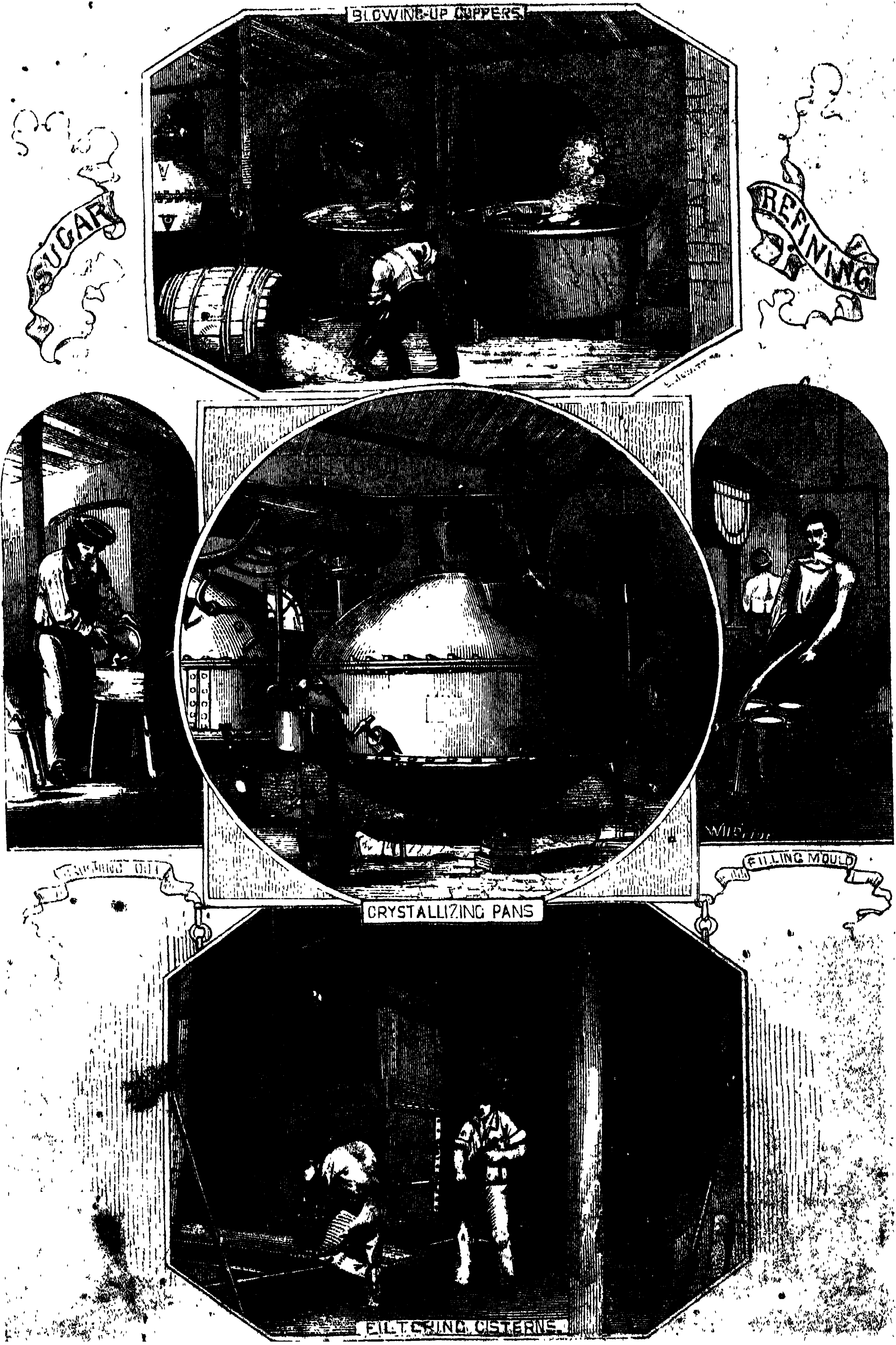
without having the remotest idea of perpetrating a joke. And really the process is not in the least alarming, in spite of its name. The sugar being brought into the receiving-room in a hogshead, the hogshead is tilted on its side, its head having previously been knocked out, and a couple of men are quickly engaged in shovelling its contents into the blow-up pans aforesaid. These are large copper vessels, some five-and-twenty feet round, and five feet high, into which steam is admitted, by means of a coil of pipes, for the purpose of dissolving the sugar. This is the first process; and the sugar, when dissolved, is a by no-means inviting-looking compound, for it is a dark, thick, muddy, clammy liquid, with bits of sticks floating in it, and, as the microscope has lately revealed, thousands of animalcules; pretty stuff, truly, to sweeten pastry with! As yet, the gluten, lime, earth, and molasses, which are always present in raw, or muscovado, sugar, are unremoved, and the substance is simply dissolved, a small portion of lime-water having been admitted to the blow-up cisterns, and constant agitation having been used to assist the operation.

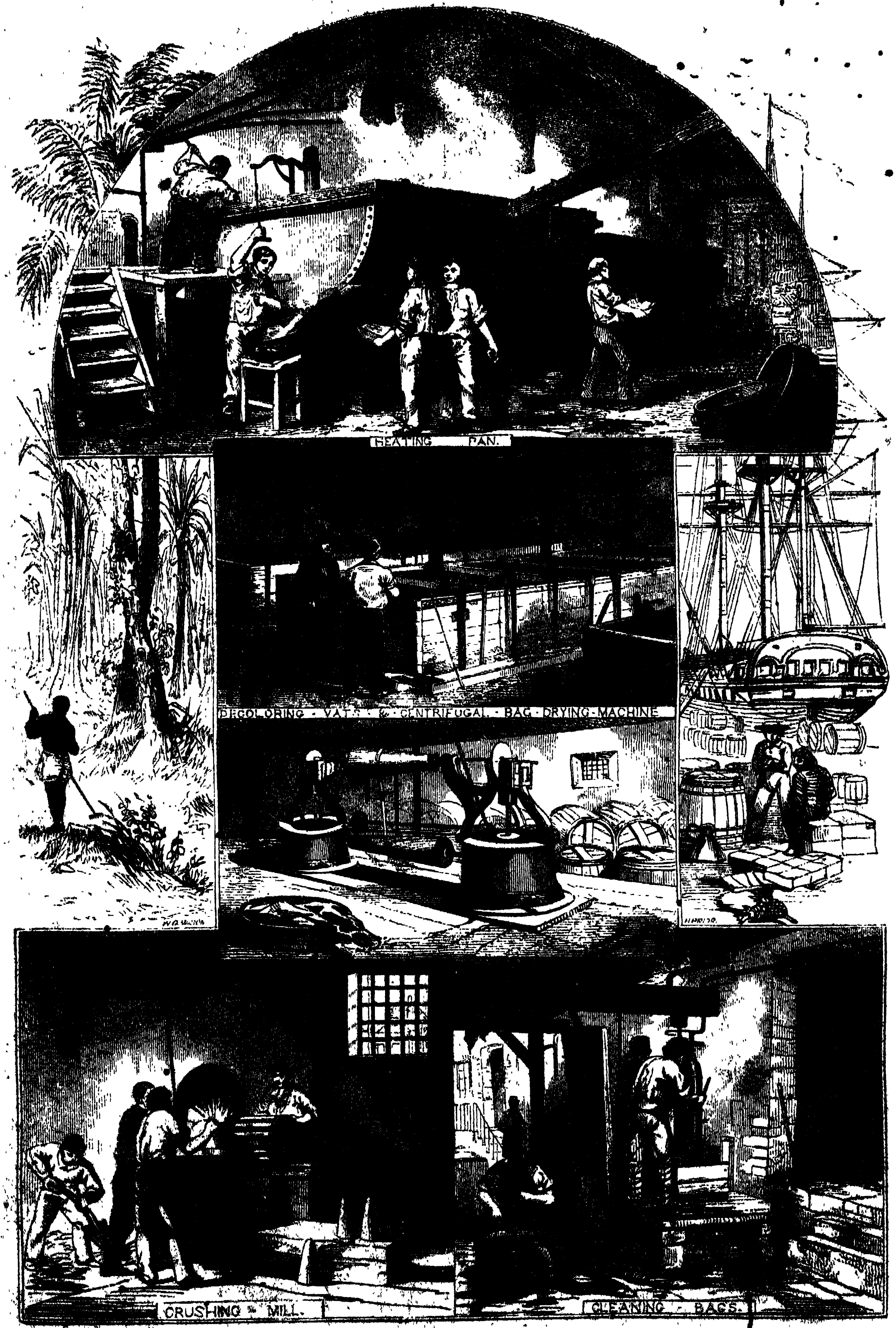
We follow our conductor, who has carefully explained all this to us at length—for we must pursue the process in regular course—and descend a dark flight of stone steps to

THE FILTERING ROOM.

When the saccharine solution, called "liquor" in the language of the factory, has been sufficiently melted, it is allowed to flow from the blow-up cisterns to the filters below, which it enters in a thick, dark, treacly-looking state. The filters consist of a series of cast-iron vessels, about six or eight feet in height, by two and a half in width. The process of filtration is not only very complete, but really highly ingenious. We will endeavour to explain the internal construction of one of th[illegible] filtering cisterns. It consists of an upright iron square, furn[illegible] an outer door for the arrangement of the interior obj[illegible] At the top is a shallow chamber for holding the liquor, and to this is attached a series of metallic tubes, depending from which are several stout canvas bags, about six feet long by two feet wide, doubled and coiled up so as to present a compact mass of cloth. Into these bags the saccharine liquor flows, and there being no lower orifice, is forced through the structure of the material till it exudes in a clear transparent stream, slightly tinged with red. Each filtering cistern holds from forty to sixty bags, and in these are retained all the impurities before spoken of, except a little colouring matter to be removed by the next process.

You may be certain that the bags thus filled in their every pore with impurities soon become clogged up. We will step into the yard outside the receiving room, and see how they are cleansed


SUGAR
REFINING
BLOWING-UP COPPERS
FILLING MOULD
CRYSTALLIZING PANS
FILTERING CISTERNS


HEATING PAN.
DECOLORING VAT & CENTRIFUGAL BAG DRYING MACHINE
CRUSHING MILL.
CLEANING BAGS.

On a couple of little platforms stand a couple of men enveloped in canvas and steam, and their faces dappled with mud. Between them, attached to a pipe through which flows the waste steam from the boiler, is one of the dirty bags turned inside out from the filter. A cock is turned on, the bag distends with steam, and the two men scrape off the filth from it like so much mud. When all the dirt that can be scraped off has been scraped off, the bag is detached from the steam pipe and thrown towards another workman, who thoroughly washes it in hot lime-water. The bags are then taken into another room, where they are dried by a patent centrifugal machine. We saw the product of these washings in a cask. It appeared to be pure mud, or dark coloured clay; but we were assured that so far from being valueless, the quantity collected was really worth about three pounds a week to the firm. This mud or clay is bought by the scum boilers, who submit it to a somewhat similar process to that which it has already undergone. The saccharine matter obtained is used principally by the blacking makers, and sometimes by the manufacturers of lollipops and sweet stuff for children; after which the residue is sold for manure, for which purpose it has sometimes brought three pounds a ton! A glance at the engraving will render our description of the above processes somewhat clearer.

The next object to be attained is the decolouration of the clear transparent reddish liquid which we have seen to leave the filters. We again follow our leader through a dark slippery way, and find ourselves in the room where stand

THE DECOLOURING CISTERNS.

Now it must be understood that the object of the sugar refiner is to remove the colouring matter from the "liquor" without either destroying its transparency or injuring its quality. For these purposes there is no agent so good as charcoal, and no charcoal so good as that obtained from the burning of bones. The intimate admixture of carbonate and phosphate of lime with pure carbon thus obtained, is called animal charcoal. To the discovery of the German chemist, Leibnitz, that common wood charcoal possesses the property of removing the colouring matter from many animal and vegetable substances, and to the further discovery, about forty years since, of M. Figuiro, that charcoal obtained from calcined bones was of much greater decolourizing power, are owing many improvements in manufactures, not the least of which is the superior method of refining raw sugar. We stand, then, before the cisterns into which has flowed the reddish transparent liquor; one of them happens to be empty, which allows us to examine the manner in which this operation is conducted. At the bottom of the filter is a false floor formed of laths a little distance apart. On this false bottom is laid a cloth which completely covers it; and on this a layer of powdered animal charcoal or "bone black" of three or four feet in thickness. The saccharine liquor from the filters flows into this cistern by means of pipes leading from one to the others; and in a few hours it percolates entirely through the charcoal bed and the layer of cloth; and, escaping through the false floor beneath, is carried off by means of a syphon pipe, a perfectly clear, transparent, and almost colourless liquid; the opaque heavy impurities were removed in the filters by means of the canvas bags, while the colourless matter has been almost entirely got rid of by this further filtration through the bed of animal charcoal. The perfect decolouration which has taken place fits the saccharine liquor for the next process, the boiling, by which the crystallization or solidification is formed.

Of course the charcoal, like the canvas bags, becomes, after two or three operations, entirely filled with impurities. This is soon remedied; for in another part of these extensive premises there are furnaces, iron retorts, &c., for re-burning the charcoal, after which it is as good as ever. Indeed, it may be said that—though it wastes, of course, in a slight degree—the power of the carbon is never destroyed, for some of it has been in use here for more than twenty years. Thus, by purifying the charcoal it may be used over and over and ever again, *ad infinitum*. The process here described was first brought into extensive operation by the Messrs. Fairrie, who likewise were the first to discover the property in the charcoal which enabled them to revivify it after it had become clogged with saccharine matter. Into the retort house the stranger is seldom or never shown; and, indeed, he would discover little if he were. We proceed, therefore, again into the Receiving Room where we watch the process of

BOILING IN THE VACUUM PANS.

The object of this process is two-fold. It has already been said, that in all raw sugars there is a certain quantity of uncrystalizable matter and water driven off in the form of steam. We will endeavour to explain. Before us are half a dozen circular, domed, air-tight copper vessels, like that represented in the engraving; each furnished with valves, taps, and pipes for the various purposes of testing the temperature of the liquor, allowing the air drawn off by the air-pump to escape, admitting steam to the boiler, evaporating the steam, &c. &c. In fact, the vacuum boiler may be considered the great heart which sets all the other parts of this factory in motion, and to which all the other processes are subsidiary. Formerly, sugar was boiled in large pans over an open fire, at a temperature of from 240° to 250° Fahr., under ordinary atmospheric pressure. But it was found, notwithstanding the greatest care in boiling, that the sugar was injured by the high temperature employed, and only partial crystalization could be obtained. For every evil there is a remedy, for every demand a supply, and for every time a man. And so it was found in this instance. The scion of a noble house, some forty years ago, conceived the happy idea of boiling sugar in vacuo; that is, by removing the pressure of the atmosphere by means of an air pump, the operation of boiling —which is only rapid evaporation—could be carried on at a very low temperature. At first, of course, as with most improvements in manufactures and the arts, there were great difficulties to be overcome; the experiments on which the plan was based had been carried on with an insufficient apparatus, and the production of small, weak, soft crystals was the only result. At last an accident was the means of clearing away all doubts as to the practical operation of the new plan. It is said that a sugar refiner in Goodman's-fields had so nearly ruined himself in his efforts to carry out Mr. Howard's views, that his son, a cleverer man than his father in many respects, withdrew from the business, and that the friends of the enthusiast were really thinking of issuing a commission of *inquirendo de lunatico* to prevent his wasting his substance. One day, however, while the gentleman in question was pondering the matter in his counting-house, one of his workmen, a German, rushed in with the exclamation, "I've found it out, Sir; I've found it out." And so he had; for, while tending one of these vacuum pans, the liquor inside happened to get too hot; to remedy which he let in a a quantity of cooler sugar, and on withdrawing a portion to examine its effect on the mass, to his astonishment he discovered that large bright crystals of sugar had formed in the pan. Another trial, and he was certain the real secret had been solved. And so it proved; and he who had been deemed a madman by his friends, and was almost ruined by his perseverance, lived to see his ideas prosper, and to become a rich man; and ever since then the plan of boiling sugar in vacuo has been universally adopted by the refiners. Indeed, they deserve all the profit and credit attending their perseverance, for in some years they collectively paid upwards of forty thousand pounds in premiums for the use of Mr. Howard's patent process.

This process, after having stood gossipping so long before the pans, we must now describe. The sugar is boiled, but where are the fires? In a distant part of the building. Whatever processes require heat, that heat is supplied by steam brought hither and thither in pipes, and carried away when it has boiled and filtered, to wash dirty bags, as we have seen; to heat stoving rooms, as we shall see; and to perform various other minor offices ere it mixes with the outer air and is lost for ever.

The plan then is this: the saccharine liquor after percolating through the charcoal, and being afterwards collected in a cistern as a colourless transparent liquid, is brought through an ascending pipe into the pans themselves. From the pans the air has been withdrawn by an air-pump; and the liquid sugar rushes up the pipe to supply its place, as in a common pump. "Nature abhors a vacuum"—but you know the adage. Steam is then admitted to the space below the sugar in the pan, and also through a number of pipes to the interior; and thus the sugar, by means of the nearly perfect vacuum created in the pan, is brought to a boiling state while at a temperature but little higher than that of a warm bath. To assist the more perfect evaporation of the sugar it is made to flow through a large iron pipe partially filled with tubes, by which means the steam is condensed and the vacuum maintained. As it evaporates, the crystals of sugar are already forming in the pan. To test the state of the granulated sugar, there are attached to each pan a thermometer, a glass test-pipe showing the height of steam inside, an index, and a tap by which the progress of the liquor in the evaporating pipe may be discovered. But the most important instrument of all is the ingenious little brass stick, called the proof rod, which may be regarded as a kind of key which unlocks a valve in the body of the pan, and, after withdrawing a portion of the crystalized sugar, locks the valve again without disturbing the vacuum inside. To test the quality of the sugar, the "boiler," as the workman employed at the pans is called, takes a sample with the proof rod, in the way described; and discovers the degree of tenacity and granulation by taking a little between his finger and thumb. By these means, apparently so simple, but really requiring a vast deal of experience and natural tact, the sufficiency or insufficiency of the boiling is at once discovered. It is then either subjected to further boiling, or is at once let down through a valve in the pan, to the

SUGAR HEATERS

below—whither we will follow it, though by a rather different road. These "heaters," into which the sugar flows from the vacuum pans, were formerly called "coolers," and for this reason: *then* the "liquor" was boiled at a very high temperature, and the granulation took place only when the liquid was brought to a lower; *now* the crystalization takes place within the boiler itself, and, for the purpose of giving the mass greater consistency, it is raised in these "heaters" to a temperature of about 180°, while it was boiled at 130° or 135°. The sugar is kept continually stirred, to drive off, in the form of vapour, the superfluous water with which it is combined, and to give the future loaf a finer and firmer texture, this stirring is called in the language of the workmen "hauling" and "mixing." This, though a busy scene, is one which is easily comprehended. It is a fitter one, however, for the pencil to delineate than the pen to describe. The liquor is now ready for the moulds; we, therefore, enter an apartment on the same floor, and at but little distance from the "heaters," called

THE FILLING ROOM.

Here an entirely new scene meets our view. About three-fourths of a very large, square, stone-paved room is covered with conical iron moulds, about two feet in length, and six inches in diameter at their large ends; the greater portion of which are standing close together, each one on its apex and supported by its neighbour, with here and there, in front, a mould standing on its base gives the necessary support to the whole. Before we have taken in the scene, we have to stand aside to let a labourer pass, who bears before him a large copper basin filled to the brim with the hot saccharine liquor. Others succeed him, some stripped to the waist, some clothed in trowsers and a sort of flannel or loose Guernsey shirt. We watch their proceedings. From the copper coal-scoop-looking machine they fill the various moulds ranged in hundreds along the floor, without spilling a single drop. It being important to fill all the moulds at about the same temperature, it is arranged that a sufficient number of men shall be employed to "fill out" the contents of one sugar boiling in about half-an-hour. While some of the workmen are thus engaged at a sort of half run in passing from the heaters to the moulds and filling out, others are occupied with little iron instruments, shaped something like solid triangles set horizontally on handles, in stirring and scraping round the edges of the moulds to prevent any adhesion, and to diffuse the small crystals still forming equally through the liquid mass of sugar. A most surprising thing it is to see how the workmen contrive to carry the scoops of hot "liquor" from the heater, and fill up the moulds, without ever scalding themselves or spilling the contents. But experience in this, as in all other mechanical operations, is the great teacher.

The sugar loaves yet contain a certain portion of molasses. By various processes they have undergone, they have been deprived of their solid impurities, a portion of their water, and the greater part of their colouring matter. To get rid of this last is the object of the next process; so, after standing in the "filling room" for about a couple of days, the moulds are carried upwards, from floor to floor, through the "pull-up hole"—a term which will be readily understood when it is stated that a sort of shaft proceeds from the basement to the highest storey, through which the loaves are lifted during the various stages of their completion.

Let us see how this molasses or *syrup* is finally made to quit the refined sugar. The moulds, which give to the refined mass the well-known sugar-loaf shape, are of various sizes, but the mode of manipulation is the same with each. In the language of the refinery, *loaves* are the best, and *lumps* the commoner description of sugar. The smallest moulds contain as little as ten pounds, and the largest not less than two hundred and fifty. We will suppose that a sufficient degree of solidification has taken place; the next process, then, is

THE WASHING, OR NETTING,

which takes place in an upper room. We proceed by a spiral stone staircase, which traverses the whole building—or rather buildings, for we should have stated long ago that this factory consists of two houses united by a covered bridge—and find ourselves in a large floor, covered all over with moulds, placed each one of them in an earthen jar. Here the "washing" takes place. The small opening at the apex of each conical mould is uncovered, and the loaf allowed to drain. But the draining does not entirely remove the syrup from the sugar, a small portion still remaining among the crystals and the coating of the loaf. To get rid entirely of that part of the syrup which is still left in the sugar, the loaves are "washed" in rather a peculiar way. Till latterly, the washing was performed by means of a stratum of fine white clay and water, which being placed on the surface of the base of the loaf, was allowed to percolate through it, and carry the colouring matter with it. At present, however, the porous surface, or sponge, is made of sugar itself, instead of clay. The rough portion of the sugar being scraped off the base of other loaves, it is mixed with water, and applied in the way the clay used to be. This "magma" or mortar percolates through the sugar, and escapes through the hole in the apex of the mould, in the shape of a fine transparent syrup of a light brown colour. When this "magma" becomes dry a solution of fine clear sugar is poured; and thus is this process repeated till the loaf has lost all trace of molasses and colouring matter, and rivals snow itself in whiteness and points of sparkling light. From room to room is this process repeated, according to the different qualities of sugar required. The syrup in which there still remains a certain portion of crystalizable matter, is treated in the same way as raw sugar, till at last nothing remains but the liquid so well known to most of us, when children, as treacle, vast quantities of which are used by the cheap confectioners and the makers of what is called sweetstuff.

Nothing now remains, therefore, but to prepare the loaves for sale, which last process is known in the factory as

BRUSHING OFF;

a term certainly not very applicable, seeing that no brush is used at all. When the "washing" or "netting"—making the sugar net, neat, or pure—is completed, the face of the loaf is made smooth by means of a scraper or sharp knife. After having remained some days in the mould, the loaf is finally released by a smart blow against a post standing up on the floor. But in spite of the most careful "washing," the point of the sugar-loaf still remains in a somewhat soft and discoloured condition, to remove which it is carried to a machine, in which a couple of cutting knives revolve by the aid of a wheel, turned either by hand or steam. The apex of the loaf being introduced to these, is speedily shaved or trimmed into the form usually seen, an operation known in the factory as "turning off."

(Concluded on page [illegible].)

PRACTICAL CHARITY.

Our engraving shows us a lady in the upper ranks of life ministering to the wants of a destitute family in a wretched garret. The furniture, and the general appearance of the room and its inmates, tell their own tale; and the husband's arm in a sling reveals the cause of all the misery. The look of painful surprise on the lady's face speaks well for her, better even than the good things with which her footman is laden. So far all is well. The tale is well adorned; it remains to point the moral. But doubtless to many of our readers it may suggest materials for a long train of reflections upon the most momentous and most painful topic of the day,—the position and prospects of "the dangerous classes." This expressive phrase, which is now universally used to designate the great mass of the poor, originated in France, and has been borrowed into our language, not less for its force and terseness, than for its singular appropriateness to a part of the framework of English society also. The fact is that the great majority of the poor and working classes are literally *dangerous* to all those whom birth, or riches, or education, or official standing, has placed above them in the scale. Ever since the peace of 1815, when men, after an interval of thirty years of war, had time to turn to projects of domestic reform, the great danger and crying sin of allowing the poor to remain uncared for and unthought of has been constantly before the public in one shape or other. Philanthropists spoke, and wrote, and toiled in vain, till great novelists and poets began to write up the labouring classes. Then came the reaction. Domiciliary visits for charitable purposes were the rage. To be unwashed, unshaven, and wretched, gave a man an unquestionable title to be considered "interesting." Fine ladies were no longer reluctant to enter the abodes of misery. Poverty, to a certain extent, lost its *lowness* and *vulgarity*. In short, charity had become fashionable. Then there were baths and lodging-houses constructed, and all sorts of plans and projects proposed and discussed, and put into execution, by royal dukes and noble lords, as they became mellowed with wine over philanthropic dinners.

DESIGNED BY KARL GIRARDET.

Nor is there anything in all this to be denounced. As far as this fashionable fever affects the poor, it must be confessed that it is the most beneficial of the follies to which the *beau monde* so often abandons itself. But without pretending to possess any insight into men's motives, it cannot be denied that a great part of those efforts, however praiseworthy in their object, are sadly wanting in regard to the manner in which they are made. What is needful to remove or diminish the mountain of crime and misery which surrounds us is not occasional good deeds done because "everybody" is doing the same, but years of unwearied usefulness. Lavish profusion in almsgiving as surely degrades its objects as it relieves their present necessities. There are few of the curses pronounced upon humanity the effects of which are not narrowed or counterbalanced, strange as it may seem, by attendant blessings. Labour, disguise it or glorify it how we may, is an evil of which we would everyone of us gladly rid ourselves were it not accompanied by independence of character and integrity of heart and purpose. But deprive a man of the spur to exertion, and you deprive him of his manliness. Make him the recipient of support which has cost him no thought and required from him no exertion, and you blunt the edge of native honour and dry up the fountains of intellectual vigour and refined sentiment. It is the fire and the hammering, the varied successions of fierce heat and piercing cold, which gives the steel its temper. The iron unwrought, untouched, untried, is soft and worthless. He who would be truly charitable, must be patient and indefatigable. It will not do to give large subscriptions to be puffed in the papers and trumpeted in reports. Our almsgiving must be in secret, and our Father, who seeth in secret, will reward us openly. The haunts of wretchedness must be sought out; the truth of stories tested by personal inspection; real, undeserved distress, by all means relieved with delicacy and tenderness, without assumptions of haughty superiority or degrading comments upon the accidents of low birth, or the humiliation of misfortunes sent by God. Everything should be done to keep alive and nurse the keen sense of self-respect, which is found in all men in a greater or less degree—in short, to relieve distress without degrading the recipient of our donations. These things are too often done by fits, and starts, and impulses, and are thus only half done. The work of good is too often undertaken with vigour, cast aside upon the first attack of aristocratic langour and ennui, and soon forgotten. But people of good and easy natures are apt also to be imposed upon by artful and designing knaves; their very indolence prompts them to reject inquiry; and incalculable injury is done by teaching the lesson that the rich are fair game for imposition, and a pleasant livelihood may be obtained apart from honest labour. The greatest curse of the poor is indiscriminate charity, or almsgiving. Gentlemen and ladies find themselves often deceived, turn sour, pronounce all paupers rogues, and button up their pockets. But they are themselves to blame. Let them not give money, or food, or clothes, to any who are able to work; let them give freely to those who are not. In organizing all schemes for benevolent purposes, let them beware of doing too much, of trenching upon individual independence and self-reliance, of taking out of the hands of the poor or labouring classes anything that they themselves can achieve. Let them be originators, projectors, encouragers, but not mischievous meddlers; and above all let them be sceptical. Let them act as the lady in our engraving—see before they believe.

BENJAMIN WEST AND HIS FAMILY.

FROM A PAINTING BY HIMSELF.

In 1738, but a small tract of the eastern coast of North America had been colonised by English settlers. New York, Philadelphia, and most of the other great towns of the union, were but small, poor, quiet places, in which the descendants of puritan fathers stood behind their counters with grave faces, living godly and frugal lives, happy in their removal from the [illegible] of the old world, and in the possession of religious liberty. Their public affairs were managed as their private, with the austere gravity, the absence of all dexterous policy or statecraft, which became their religious creed. Worldly pomp or show or glitter, the refinements of art or luxury, and the whims of [illegible], were alike eschewed amongst them as devices emanating from the archfiend himself for the demoralisation of mankind. The order of the time and place was plainness and simplicity in all things—in speech, in dress, in furniture, and even in education. Strange to say, from amongst the strictest of these strict sects, the quakers of Pennsylvania, arose one of the greatest painters of modern times. Benjamin West was born in the town of Springfield in 1738. Some of his ancestors (so ran the family tradition) had won high renown in the old wars of France and England, and a great preacher of the Society of Friends prophesied that the young infant would one day be as famous as they by his fervent advocacy of the doctrines of peace. The prophecy was in part true—true to his future success, but mistaken as to his vocation in life. His parents, however, were delighted by the expectations formed by their neighbours of their son, and, though uncertain in what particular department his talents lay, were content to wait with patience until time and Providence should develop them. As might naturally be expected, there was nothing very remarkable about the child for the first four or five years of his life. When he was in his seventh year, his mother left him alone one evening during the summer, and, putting a fan into his hand, gave him directions to drive away the flies from annoying a baby which slept in a cradle. While performing this duty, his attention was attracted by the calm and peaceful aspect of the infant, and the smile of innocence which played upon its lips. The love of art was beginning to live within him, and, in obedience to the first of its impulses, he attempted, with no other implements than black and red ink and a pen, to fix on paper the likeness of his little sister. While thus engaged, his mother came in, and overlooked him without being observed. In the first moments of confusion he attempted to conceal the paper, but on giving it up she was surprised and delighted by the truth and accuracy of the sketch. It must be remembered that at this time little Benjamin had never seen a picture.

But even this did not lead his friends to suspect that he would ever adopt painting as his calling; but it had one good effect—it gained for him the approbation and encouragement of his mother. As he grew old, the neighbours wondered at his enthusiastic admiration of nature. In summer he wandered through the fields collecting the wild flowers, and in autumn, the American "fall," he often staid out for whole days gazing in silent rapture at the rainbow tints of the foliage in the woods. But a fine sunset, the purple and golden clouds which drape the king of day as he sinks to rest, furnished him with a continually recurring source of delight. In the meantime, the sketching of men, and trees, and farm animals, with chalk on the doors or the floor improved his powers of observation, and increased his manual dexterity. The Mohawk Indians, whose territory was in the neighbourhood, paid frequent visits to Springfield. The amity which from the first settlement of the state had subsisted between them and the colonists led to frequent interchange of kind offices. The savages became very fond of little Ben; and observing his love for drawing, they gave him some of the red and yellow paint with which they were in the habit of daubing their own faces. His mother made him a present of a piece of indigo; and having thus three colours, red, yellow, and blue, from a mixture of the blue and yellow he manufactured green. Nothing was now wanting but a brush. Necessity is the mother of invention. He seized the cat, and by a copious extraction of hair from her back furnished himself with the required instrument. He now set to work in right earnest. The parlour was speedily adorned with pictures of Indian chiefs, birds from the forest with gorgeous plumage, and wild flowers from the fields. All these efforts evinced wonderful faithfulness to nature. Nothing of the kind had ever been seen in the house of a Pennsylvanian farmer before.

About this time a merchant of Philadelphia, named Pennington, a Friend, and a man of high attainments and enlarged views, came down to see Benjamin's father, who was his old and intimate friend. He looked at the paintings with astonishment, and upon being told who had executed them, and how he had done it, he patted the little artist on the shoulder, and said, "Verily, the boy hath a wonderful faculty. Some of our friends might look upon these matters as vanity, but little Benjamin appears to have been born a painter; and Providence is wiser than we." His mother now remembered the old quaker's prophecy, but she could not imagine how her son was to become great or useful merely by making pictures. Immediately after Mr. Pennington's return to Philadelphia, he sent down a box of paints, several brushes, canvas, and a number of beautiful engravings and landscapes. For some time after their arrival Benjamin was busily employed in the garret, rising early, eating quickly, and going late to bed. For several days his mother did not interfere with him, but at last she could restrain her curiosity no longer, and going up, found to her delight and astonishment that he had copied parts of two of the engravings sent him by Mr. Pennington, so as to make one painting of both, having every object in its natural colours, and the *toute ensemble* was such that many an older artist need not have been ashamed of it.

When verging on manhood he was sent to school in Philadelphi[illegible] while there was attacked by fever. While confined to his bed, the shutters were closed to exclude the light, but a few rays nevertheless found their way in through a chink. As he lay awake in bed, he was surprised to see the figures of cows, pigs, and other objects passing in the street, reflected upon the ceiling of the room. Upon examination he discovered the scientific principle upon which the phenomenon rested, and then by means of it constructed a camera obscura, or magic lantern, which was afterwards of great use to him in drawing landscapes. He continued to paint until he had reached the age of manhood, and it was time for him to choose his calling in life. His parents were now in great perplexity. They knew that many of their sect considered painting a vain and profitless occupation. So to divide their responsibility they assembled all the preachers and ablest men of their society in the meeting-house, and laid the question before them. After a long discussion, all came to the conclusion that God had given Benjamin specific talents, which would be thrown away upon any other trade or profession—they acknowledged that even pictures may do good in their way, and resolved not to oppose his inclination. The old men, therefore, laid their hands on his head, blessed him, and sent him on his way rejoicing. His progress was now rapid. He became everywhere famous; and on his going over to Europe, his society was courted by the great and powerful. But wherever he went he retained his quaker simplicity, keeping on his hat in the presence of crowned monarchs. When he was twenty-five years old, he established himself in London, and in process of time became painter to George III., and President of the Royal Academy. The king employed him upon a series of paintings illustrative of the life and miracles of Christ for the decoration of St. George's Chapel at Windsor. One of his pictures, "Christ Healing the Sick," was exhibited at the Royal Academy. It contained a number of figures as large as life, and attracted immense crowds. By its side hung a small and faded landscape—the one he had painted in his father's garret years before, and when good Mr. Pennington had sent him the materials. "Christ Healing the Sick" he presented to the hospital at Philadelphia, and the sum raised by its exhibition to the public was so great, that they were enabled to enlarge the building and receive thirty additional patients. His "Death of Wolf" is too well known to need more than a mere mention.

The engraving at the head of our article is from a painting by himself. The calm happiness, the resigned but dignified and even amiable serenity of port and features which we may suppose to have pervaded a quaker family of the olden time, are here depicted to the life. He died in 1820, having reached the ripe age of eighty-two, after one of the happiest, most successful, and most useful lives to be found in the annals of great men.

A VISIT TO A SUGAR REFINERY.—(*Concluded from page* 171.)

In the inferior kinds of refined sugar, the softened end is simply chipped off, which leaves the loaf in the shape of a truncated cone. The piece chipped off is either used as "magma," or is sold by the grocers under the name of "crushed crystalized West Indian sugar;" it has a light brown colour, and is scarcely inferior to the remainder of the loaf, except that it contains a small portion of molasses.

We had almost forgotten to say, that before the sugar is finally ready for sale it is papered up, and thoroughly dried in a stoving room, which is heated to a very high temperature by means of a series of iron pipes, through which the waste steam from the boiler is made to pass.

We have now ended our visit, and we may merely say, in conclusion, that whatever improvements have been made in the machinery employed in the refining process, the public have been the immed[illegible]cipients of the benefits accruing; for whatever the price [illegible]fined or brown sugar, it is found that the cost of the l[illegible], or refined sugar has seldom exceeded it by more th[illegible] per cent, whereas in former times forty or fifty per ce[illegible] the mark.

Abo[illegible] the workmen employed in a sugar refinery are Germans, and about a third of the remainder are [illegible]. The heat in factories of this description was formerly excessive; but such is the force of habit, that many men work without a shirt in a room the temperature of which would almost admit of their donning a great coat. It will have been seen that the trade is not of the cleanest; but at any rate the product of the vacuum pans may be considered as free, or perhaps freer from adulteration than any article consumed by the public.

In the following brief account of the patents granted during the last forty years [illegible] improvement in the process of refining muscovado sugars, [illegible] reader may possibly find a grain of interest.

In 1812, Charles Edward Howard, Esq., of Westbourne-green, in the county of Middlesex, obtained his first patent for boiling sugars in vacuo as above described; and in 1813 he had granted him another patent for improvements in the same process.

In May, 1815, a patent was granted to Peter Martineau, Esq., of Canonbury-house, Islington, for improvements in the method of clarifying raw sugars. In the place of the bullocks' blood and liver previously employed, he introduced the use of animal charcoal, bituminous earths, ochres, and vegetable charcoal, the animal charcoal forming the principal feature of his invention.

In June, 1815, Mr. John Taylor, of Stratford, Essex, obtained a patent for a new method of filtering sugars through strong linen cloths by means of great pressure, a plan no longer adopted.

In 1820, Mr. Jennings obtained a patent for refining sugar by means of a new agent, alcohol, a method which was abandoned in consequence of its extreme danger.

In May, 1817, James Johnson, of Willow-park, Greenock, had a patent granted him, the principal feature of which was the neutralization of the acids of the molasses by the removal of the syrup formed during the process of [illegible]. One part of his specification, which proposed [illegible] loaves hexagonal in shape for the convenience of packing, [illegible] the consideration of manufacturers.

In 1847, Dr. Scoffern obtained a patent for the improvements in the process of refining sugars, the principal point insisted on being the employment of sulphurous acid for the separation of lead from saccharine solutions, so that the basic acetate of lead, the purifying qualities of which are well known, might be used by sugar refiners. The process is not now adopted, we believe, by any manufacturers, on account of the difficulty of entirely removing the lead from the sugar.

In 1848, Mr. George Michels, of the United States, obtained a patent in his native country for the manufacture of sugar, in which the chief features were the cutting of the cane in thin slices transversely through their saccharine cells, and the use of oxalate of alumina as the chemical agent.

And, lastly, Messrs. Ocland, of Plymouth, have patented a plan for the better defecation and decolouration of the saccharine liquor.

With these explanations, we trust that our friends and readers will take their cup of tea in peace.

THE LADIES' DEPARTMENT.

BRIDAL PURSE IN CROCHET.

MATERIALS.—Six skeins of white crochet silk, two skeins of *ombré* scarlet ditto, in long shades, three skeins of slate-colour, and one of bright scarlet. Two oz. of transparent white beads, rather larger than seed beads, four strings of gold, the same size, and a hank of steel to match. For the garnitures (which must be entirely of bright steel), two rings, a handsome tassel for one end and a deep fringe for the other. Boulton's tapered indented crochet-hook, No. 23.

Begin by threading all the white beads on the white silk; half the gold on the ombré cerise, and the steel on the slate-coloured. What scarlet silk is used in the square end is without beads; the few rows at the other end, of that colour, are threaded with gold, which may be put on afterwards.

The design of the square end consists of a spray of roses and leaves, the former in scarlet ombré with gold beads intermixed, the latter with slate-silk and steel. The ground is composed wholly of white beads, one being dropped on *every* stitch; where, therefore, the scarlet and slate silks are worked without beads, they appear to be *in intaglio*. A scroll of steel beads below the group is intermixed with the white, and the top and bottom of the square end are finished off with vandykes of plain scarlet without beads. At the bottom is an open pattern in scarlet, to which is attached the fringe.

Begin with the plain scarlet silk, with which make a chain of 100 stitches, and close it into a round. Work one round in scarlet, using in the end of white silk.

2nd round: In which you begin to drop on the white beads. × 2 white, 3 scarlet, × 20 times.

3rd: × 3 white, 1 scarlet, 1 white, × 20 times.

4th: All white; work in the scarlet silk all round, and then fasten it off, as no more is required until the whole square end is worked.

5th: × 22 white, 1 steel, 23 white, 1 steel, 3 white, × twice.

6th: × 21 white, 2 steel, 22 white, 2 steel, 3 white, × twice.

7th: × 3 white, 1 steel, 5 white, 2 steel, 3 white, 2 steel, 4 white, 3 steel, 2 white, 1 steel, 6 white, 2 steel, 4 white, 2 steel, 3 white, 3 steel, 4 white, × twice.

8th: × 3 white, 2 steel, 3 white, 3 steel, * 2 [illegible] 4 steel, * twice; [illegible] white, 2 steel, 4 white, 3 steel, [illegible] 3 steel, 2 white, 4 steel, 4 white, × twice.

9th: × 2 white, 3 steel, * 2 white, 4 steel, [illegible] times; 1 white, [illegible] 3 white, 4 steel, † 2 white, 4 [illegible] twice, 4 white, × [illegible].

10th: × [illegible] white, 2 steel, * 3 white, 3 [illegible]; 2 white, 2 [illegible] white, 3 steel, [illegible] white, [illegible] twice; 5 white, × twice.

11th: × 1 [illegible] 1 steel, 2 white, 4 steel, [illegible] 3 steel, 3 white, 2 steel, [illegible] steel, 3 white, 4 steel, [illegible] 3 steel, 3 white, 2 steel, [illegible] 1 steel, 3 white, × twice.

12th: × 4 steel, [illegible] white, 1 steel, [illegible] white, 5 steel, [illegible] white, 3 steel, 4 white, 4 steel, [illegible] white, 1 steel, [illegible] white, 5 steel, [illegible] white, 3 steel, 4 white, 1 steel, 3 white, × twice.

13th: × 3 white, 2 steel, 2 white, 1 steel, 4 white, 5 steel, [illegible] white, 2 steel, 3 white, [illegible] steel, [illegible] white, [illegible] steel, 4 white, [illegible] steel, 4 white, 2 steel, 4 white, × twice.

14th: 3 white, 2 steel, 2 white, 3 steel, 1 white, 4 steel, 8 white, 2 steel, 2 white, 3 steel, 4 white, 4 steel, 9 white, × twice.

15th: × 4 white, 1 steel, * 3 white, 4 steel, * twice, 8 white, 1 steel, † 3 white, 4 steel, † twice, 8 white, × twice.

16th: × 9 white, 4 steel, 4 white, 2 steel, 13 white, 4 steel, 4 white, 2 steel, 8 white, × twice.

17th: All white.

18th: × 14 white, 2 slate silk, 34 white, × twice.

19th: × 14 white, 3 slate, 8 white, 5 steel, 20 white, × twice.

20th: × 14 white, 5 slate, 4 white, 9 steel, 12 white, 2 steel, 4 white, × twice.

21st: × 11 white, 11 slate, 1 steel, 3 slate, 2 steel, 10 white, 2 steel, 1 white, 2 steel, 4 white, × twice.

22nd: Begin the ombré scarlet, × 16 white, 7 slate, 2 steel, 12 white, 2 gold, 2 white, 2 steel, 4 white, 2 steel, 1 white, × twice.

23rd: × 13 white, 11 steel, 12 white, 1 gold, 2 scarlet silk, 1 gold, 7 white, 2 steel, 1 white, × twice.

24th: × 14 white, 9 steel, 3 white, 2 steel, 7 white, 1 gold, 3 scarlet, 6 gold, 5 white, × twice.

25th: × 10 white, 1 gold, 5 white, 7 steel, 2 white, 4 steel, 6 white, 1 gold, 3 scarlet, 1 gold, 5 scarlet, 1 gold, 1 white, 2 steel, 1 white, × twice.

26th: × 7 white, 2 gold, 2 scarlet, 4 gold, 5 white, 2 steel, 3 white, 4 steel, 2 slate silk, 4 white, 1 gold, 2 scarlet, 1 gold, 6 scarlet, 1 gold, 1 white, 2 steel, 1 white, × twice.

27th: × 9 white, 1 gold, 2 scarlet, 1 gold, 2 scarlet, 1 gold, 4 white, 1 steel, 1 slate silk, 3 white, 4 steel, 4 slate, 2 white, 1 gold, 2 scarlet, 1 gold, 3 scarlet, 1 gold, 2 scarlet, 1 gold, 4 white, × twice.

28th: × 11 white, 3 gold, 1 scarlet, 1 gold, 4 white, 1 steel, 1 slate, 3 white, 3 steel, 5 slate, 2 white, 1 gold, 2 scarlet, 1 gold, 3 scarlet, 1 gold, 2 scarlet, 3 gold, 2 white, × twice.

29th: × 8 white, 3 gold, 2 scarlet, 1 gold, 1 scarlet, 1 gold, 4 white, 1 steel, 1 slate, 3 white, 3 steel, 5 slate, 2 white, 1 gold, 1 scarlet, 2 gold, 1 scarlet, 2 gold, 3 scarlet, 1 gold, 2 scarlet, 1 gold, 1 white, × twice.

30th: × 8 white, 1 gold, 1 scarlet, 1 gold, 3 scarlet, 2 gold, 3 white, 2 steel, 1 slate, 3 white, 3 steel, 5 slate, 3 white, 3 gold, 3 scarlet, 1 gold, 4 scarlet, 1 gold, 2 white, × twice.

31st: × 8 white, 1 gold, 1 scarlet, 1 gold, 3 scarlet, 2 gold, 3 white, 1 steel, 2 slate, 4 white, 2 steel, 5 slate, 4 white, 7 gold, 3 scarlet, 1 gold, 2 white, × twice.

32nd: × 8 white, 1 gold, 2 scarlet, 4 gold, 3 white, 1 steel, 2 white, 1 steel, 4 white, 2 steel, 5 slate, 5 white, 4 gold, 5 scarlet, 1 gold, 2 white, × twice.

33rd: × 9 white, 5 gold, 1 white, 3 steel, 3 white, 1 slate, 1 steel, 3 white, 1 steel, 5 slate, 5 white, 1 steel, 2 white, 1 gold, 5 scarlet, 1 gold, 3 white, × twice.

34th: × 20 white, 1 slate, 1 white, 1 steel, 2 white, 2 steel, 5 slate, 4 white, 1 steel, 4 white, 5 gold, 4 white, × twice.

35th: × 19 white, 3 slate, 2 white, 2 steel, 4 slate, 5 white, 2 steel, 14 white, × twice.

36th: × 14 white, 1 slate, 3 white, 3 slate, 1 steel, 3 white, 4 steel, 7 slate, 2 steel, 12 white, × twice.

37th: × 14 white, 7 slate, 1 steel, 3 white, 2 steel, 2 white, 9 slate, 2 steel, 10 white, × twice.

38th: × 14 white, 6 slate, 2 steel, [illegible] white, 2 steel, 1 slate, 1 steel, 5 white, 5 slate, 2 steel, 9 white, × twice.

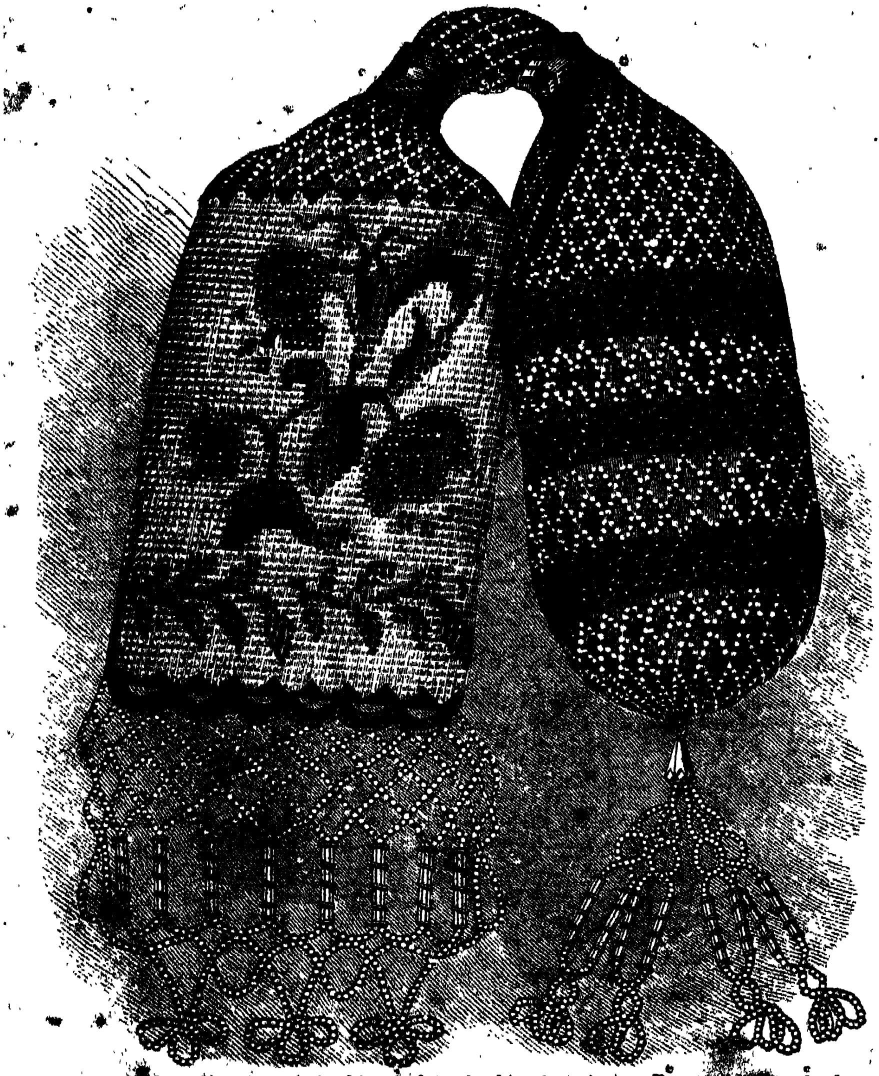
39th: × 10 white, 2 steel, 1 white, 2 steel, 4 slate, 2 steel, 4 white, 5 steel, 5 white, 4 slate, 3 steel, 8 white, × twice.

40th: × 10 white, 2 steel, 2 white, 6 steel, [illegible] white, 1 steel, 3 slate, 2 steel, 4 white, 4 slate, 3 steel, 6 white, 1 steel, × twice.

41st: × 1 steel, 6 white, 2 steel, 16 white, 1 steel, 3 slate, 3 steel, 4 white, 5 slate, 3 steel, 4 white, 1 steel, 1 slate, × twice.

42nd: × 1 steel, 7 white, 1 steel, 1 white, 2 steel, 1 white, 5 gold, 7 white, 1 steel, 4 slate, 2 steel, 5 white, 3 slate, 1 white, 3 steel, 3 white, 2 steel, 1 white, × twice.

43rd: × 10 white, 2 steel, 1 white, 1 gold, 4 scarlet, 1 gold, 6 white, 1 steel, 4 slate, 3 steel, 5 white, 2 slate, 2 white, 2 steel, 5 white, 1 steel, × twice.



44th: × 12 white, 3 gold, 3 scarlet, 2 gold, 4 white, 1 steel, 1 white, 4 slate, 3 steel, 5 white, 2 slate, 3 white, 1 steel, 1 white, 2 steel, 2 white, 1 steel, × twice.

45th: × 7 white, 2 steel, 2 white, 1 gold, 3 scarlet, 2 gold, 2 scarlet, 1 gold, 4 white, 1 steel, [illegible] white, 5 slate, 2 steel, 5 white, 2 slate, 4 white, 1 steel, 2 white, 1 steel, 1 white, 1 steel, × twice.

46th: × 7 white, 2 steel, 1 white, 1 gold, 6 scarlet, 1 gold, 1 scarlet, 1 gold, 3 white, 2 steel, 1 white, 5 slate, 2 steel, 4 white, 2 slate, 3 white, 1 slate, 1 white, 1 steel, 2 white, 1 steel, 1 white, 1 steel, × twice.

47th: × 10 white, 1 gold, 7 scarlet, 2 gold, 3 white, 1 steel, 3 white, 5 slate, 2 steel, 1 slate, 8 white, [illegible], * 2 slate, 1 white, * twice, × twice.

48th: × 10 white, 1 gold, 3 scarlet, 2 gold, 2 scarlet, 2 gold, 2 white, 1 steel, 3 white, 5 slate, 2 steel, 3 slate, 7 white, 2 slate, 1 white, 3 slate, 20 white, × twice.

49th: × 9 white, 3 gold, 4 scarlet, 6 gold, [illegible] white, 4 slate, 3 steel, 3 slate, 5 white, 3 slate, 3 white, 1 steel, 2 white, × twice.

50th: × 9 white, 1 gold, 2 scarlet, 1 gold, 4 scarlet, 2 gold, 6 white, 4 slate, 1 white, 4 steel, 3 slate, 3 white, 4 slate, 3 white, 1 steel, 2 white, × twice.

51st: × 9 white, 1 gold, 3 scarlet, 3 gold, [illegible] 4 slate, 1 steel, * [illegible] white, 3 steel, * twice, 9 slate, 3 [illegible] 1 steel, 3 white, × twice.

52nd: × 10 white, 1 gold, 5 scarlet, 2 gold, [illegible] white, 4 slate, 1 white, 1 steel, [illegible] white, 1 steel, 2 white, 3 steel, [illegible] slate, 2 steel, 4 white, × twice.

53rd: × 11 white, [illegible] gold, 5 white, 3 steel, 3 white, [illegible] steel, 5 white, 6 steel, 10 white, × twice.

54th: × 22 white, 1 steel, 2 white, * 1 steel, 1 white, * twice, 1 steel, 5 white, 2 steel, 6 white, × twice.

55th: × 23 white, 4 steel, 2 white, 1 steel, 2 white, 2 steel, 2 white, 7 steel, 7 white, × twice.

56th: × 19 white, 2 steel, 4 white, 1 steel, 4 white, 2 steel, 2 white, 1 steel, 3 white, 4 steel, 8 white, × twice.

57th: × 18 white, 1 steel, 2 white, 4 steel, 25 white, × twice.

58th: All white, work round to the centre of one side; also

59th: (Begin again with the plain scarlet), × 1 scarlet, 4 white, × 20 times.

60th: × 2 scarlet, 2 white, 1 scarlet, × 20 times.

61st: All scarlet; fasten off scarlet.

62nd: With the white silk, 3 chain, dropping a bead on every chain, miss 3, s.c. on both sides of the fourth; repeat all round.

Now, instead of working round, work backwards and forwards, *dropping a bead on every chain* stitch, so that they may all come on the right side of the purse.

1st row: 5 [illegible], s.c. in same stitch, × 5 c.h., miss 3, s.c. on s.c., × all along the row.

2nd row: 6 c.h., turn, s.c. on centre of 5 c.h., × 6 c.h., s.c. on centre of next loop of 5, × to the end.

Repeat [illegible] row backwards and forwards until [illegible] are done; then work [illegible] same pattern all round for 6 rounds. Thread the rest of the gold beads on the scarlet silk, and do 2, rounds [illegible] same way with it; then 3 rounds of white; then 2 [illegible], 3 white, then 2 scarlet.

To diminish at the end, do 2 rounds [illegible], like the previous [illegible] with only 4 chain, [illegible] with 3 chain; and fina[illegible] with 2 chain between the s.c.

Draw [illegible] with a needle and white silk; sew on the tassel, and slip on the rings.

At the other end, do a row to close [illegible] with the plain scarlet in s.c.; on which work × 6 c.h., [illegible] s.c. under 5th, × 10 times. Turn, and in each loop work [illegible], 4 d.c., 2 s.c. Fasten off, and sew on the deep fringe garniture.

THE KNIGHTS OF MALTA.

ALOF DE VIGNACOURT, GRAND [illegible]. FROM A PAINTING BY MICHAEL ANGELO CARAVAGGIO.

ONE of the most [illegible] features in the great [illegible] which Europe underwent in the middle ages, was the adaptation of christianity to the prejudices and passions of heathenism. Upon the fall of the Roman empire the Church found herself alone amidst the ruins, face to face with an enemy with whom, at first sight, she knew not how to deal. Learning, eloquence, logic, historical proofs, purity of life, and repudiation of worldly pomp and vanity, the weapons with which she had so successfully combated the refined philosophy of Greece and the cold scepticism of Rome, could avail her nothing against the [illegible] barbarians who had never heard of the subtleties of the schools, whose dearest pleasures were those of sense, and whose paradise in the halls of Woden, paved with skulls and reeking with the blood of their enemies, wanted even the idea of a dreamy but still spiritual and peaceful existence which attached to the Elysium of the ancient world and prepared the votaries of the old gods to hear of, and believe in the joys of the Christian heaven. Argument was useless amongst a people who never debated; appeals to reason or to right were idle where the sword was the supreme arbiter of all controversy, and where learning was unknown. To induce men to whom war was a sacred duty and even a religious rite, at once to lay aside their arms when flushed with victory and incited by plunder, the Church knew to be useless—to denounce their brutality and coarseness she feared would prove dangerous. Wisely perceiving that all change in their manners must be the slow work of time and circumstances, she determined to relinquish some portion of her ancient claims and practices, and adapt herself as best she could to the altered state of things. She saw that the imagination of the Germans was ardent and excitable. The profound gloom and vast extent of their native forests, and the awful but desolate sublimity of the seas of the north, had not been without their effect in rendering these untutored children of nature profoundly susceptible to all influences which savoured of the mysterious and supernatural. To work upon the senses was to win over the whole man. She saw their weak point, and immediately set to work to storm it.

Her worship became gorgeous and imposing, her ceremonies were invested with a lofty and impenetrable sanctity, and the adoration of the Virgin cast out from the hearts of the barbarians the goddesses sung by the olden bards, and made the fire of devotion burn with a steadier and purer flame But to preach peace and long suffering and the rendering of good for evil to men who had drunk in martial ardour with their mother's milk, would have been "to forbid the mountain pines to wag their high tops, and make no noise when they are fretted with the gusts of heaven." The military spirit could not be eradicated, but it might be brought into subjection, controlled and directed against other objects. This was done It was enlisted in what was believed to be Christ's service, and encouraged and prompted to expend itself upon the enemies of His faith. The plan was successful. The idea was easily grasped by the new converts, and eagerly acted upon. The growth of chivalry favoured its development. Thousands abandoned the haunts of men to engage in fierce conflicts with the fiends of darkness in lonely fastnesses, where none but God and the saints could witness their struggles and applaud their triumphs The pangs of hunger and thirst and cold, the promptings of lust and pride, were regarded as so many assaults of the devil To endure unflinchingly the extremity of self-torture and privation was considered a glorious victory.

Others, whose temperaments were less excitable, and whose imaginations were less ardent, though cheerfully undertaking vows of poverty, obedience, and abnegation of self, were yet loth to abandon the tented field and the fierce excitement of combat with mortal foes. These it was who founded the various military orders of monks which appear so prominently in the history of the middle ages.

Foremost amongst these were the *Knights of St John of Jerusalem*, or as they were more commonly called, the *Knight's Hospitallers*. This order was founded in Europe, and, proceeding to Jerusalem, its members there built an hospital for the reception and protection of pilgrims to the Holy Sepulchre, who were at that time subjected to great ill-treatment by the infidels.

When Pope Clement V. suppressed the Templars for their numerous and flagrant misdemeanours, he transferred their revenues to the Knights of St. John. The latter continued to flourish and increase in numbers until the downfall of the Latin kingdoms in the East, when they were driven out by the Saracens. They then took refuge in Acre, and ably defended it against the Mohammedans in 1290. They afterwards seized upon the island of Rhodes, and held it against all invaders until 1522, when they were driven out by Solyman, the Turkish Sultan. Charles V. of Germany, having a short time previously come into possession of Naples and Sicily, and some other islands of the Mediterranean, he gave them possession of Malta, to hold it for him in fief, on condition that they should defend Sicily against the assaults of the Turks. Not only, however, did they undertake this, but proclaimed themselves the uncompromising foes of Islamism everywhere.

When they took possession of the island, they found it barren and unpromising. With the exception of one small castle, in which the Grand Master and some other high officers of the order took up their quarters, there was not a single habitation worthy of the name. The population was composed of a few poor fishermen, who managed to eke out but a scanty subsistence. The knights, therefore, relinquished the idea of remaining on it, but determined upon seizing some strong fort on the continent in which they could reside permanently, and to fortify Malta as a place of refuge in case of reverse. When they had accomplished the latter task to their satisfaction, they despatched a force to take possession of Modon, a town in the Morea. The enterprise was partially successful. The place was entered in the night and secured, but on the morrow some of the knights abandoned themselves to excesses unbecoming men of their profession, and the inhabitants, rising *en masse* before the whole of the expedition had arrived, put them to flight after a desperate resistance—but not before they had succeeded in carrying off 800 women.

Being now convinced that Malta must henceforward be their place of abode, the Hospitallers directed their whole attention to its fortification, and did not relax their efforts during [illegible] years, until it was so secured that it might confidently be expected to defy the most desperate assaults of the Saracens. They were now called the *Knights of Malta*, and were looked upon as the defenders of Christendom Most of the European monarchs hastened to aid them with supplies of men, arms, ammunition, and money; and the order was at last divided into eight *langues*, or nations, representing the eight kingdoms which supported it. From each of these one of the superior officers of the order was taken Provence supplied the "Grand Commendator of Religion," Auvergne, the "Marshal," France, the "Grand Hospitaller," Italy, the "Chief Admiral," Germany, the "Grand Bailiff," Castile, the "Grand Chancellor," and England, the "Grand Commander of the Cavalry" All these functionaries possessed large endowments of land in their respective countries, the revenues of which they drew every year, and applied them to the aggrandisement of the order; and as the value of this sort of property, of course, every year increased with the growth of commerce and manufactures, the wealth and splendour of the knights at last became scandalous in the eyes of many of the faithful

Soon after their settlement in Malta, they fixed on a firm basis the rules which were to govern their order. They differ little from those of most other monastic institutions, except that it is apparent that the aristocratic element rather than the purely religious enters largely into their composition. The equality of all men before God, and renunciation of worldly distinctions; "the boast of heraldry, and the pomp of power," which other association of men devoted to the service of the church loudly proclaimed, and laid down as a fundamental principle of their organisation, are not here to be found. None could be admitted into the order who could not prove their nobility through four generations both of their paternal and maternal ancestors, and this rule was hardly ever departed from, except in the case of sons, legitimate or illegitimate, of kings or sovereign princes. All were bound by an oath to render faithful obedience to their superiors, to bear true allegiance to the catholic church, to exercise unceasing hostility towards all pirates and infidels, and to observe the strictest chastity. These conditions might be dispensed with by the pope, or by a chapter of the order, but it was in very few cases that the strict letter of the law was ever departed from.

The government of the society was of a mixed description. The Grand Master coined money, pardoned criminals, and exercised [illegible] sovereign powers; but he was assisted by a council [illegible] *Crosses*, whom he consulted upon all affairs of importance. Before the admission of any knight he was obliged to undergo a noviciate, longer or shorter according to his age at the period of his application; and during this interval he was carefully trained in the art of warfare both by land and sea. Their fortifications were now brought to the highest state of efficiency, and they had built and equipped a powerful navy, which took a leading part in the victories of Andrew Doria, the celebrated Genoese admiral. They also assisted Charles V. in his expedition against Algiers; but in May, 1565, their strength and valour were put to the severest test that they were ever destined to undergo. Thirty thousand of the best soldiers of the Turkish army, when Turkey was in her prime, were sent to attack them, under the command of Mustapha Pacha, an old and experienced officer. One of the most memorable sieges recorded in history followed. The Turks were again and again reinforced, and brought to bear on the place all the appliances which science was then introducing into the art of war, but in vain. After a siege of four months they were obliged to relinquish the attempt in despair, after losing twenty-four thousand men and twenty-four pieces of artillery. The loss of the Maltese amounted to two hundred and forty knights of the order and five thousand men. To detail a tithe of the feats of desperate valour performed on both sides would need twice the space we can devote to the subject.

After this no further attack was ever made upon the island. Consciousness of security, and the natural desire of men to repose on the laurels after a dearly bought victory, caused the knights to fall into luxurious and debauched habits. The Grand Master's government became a pure despotism. His court was one of the most splendid in Europe; so that at the close of the eighteenth century nothing was to be seen on the island but frivolity, dissipation, and intrigue. The younger sons of all the great families of Europe crowded to become members of the order, so that it was considered, says a celebrated traveller, "one of the best academies for politeness on the globe." But how this could be in society where no respectable woman ever set her foot, and where the vow of celibacy was openly and shamelessly broken by the formation of connexions vastly more sinful than marriage, we confess we are at a loss to conceive. The end of all this abuse and abomination was, however, close at hand. The age for military monks was gone by, and the world was anxious to be rid of them.

After the French Revolution Buonaparte took possession of the island, and turned the knights out. It was then seized upon by the British, and after varied fortunes was finally ceded to the latter by the Congress of Vienna, and in their possession it now remains. The property of the knights in various countries was appropriated by their respective governments, and the order is now totally extinct.

Vignacourt was the scion of an ancient and noble house of Picardy, and entered the order at an early age. He rose step by step to the dignities of Grand Cross and Grand Hospitaller of France, and was elected Grand Master on the death of Gazzez, in February, 1601. His merit alone had won him the suffrages of the knights. Never was there a more orthodox hater of heretics and infidels, Jews, Turks, and unbelievers, of every hue and clime; and throughout the course of his brilliant reign (for reign it was) he pursued the enemies of the faith with fire and sword with an energy which must have proved well-pleasing in the eyes of the Church. But at the same time he was not inattentive to internal improvements, and he has left behind an imperishable monument of his greatness in the shape of a magnificent aqueduct, four miles long, which he constructed in 1616 to supply the city of Savaletta with water. He was killed by a sunstroke on September 14, 1622.

Our engraving is taken from a portrait of one of the most distinguished of the Grand Masters, Alof de Vignacourt, painted by the dissolute and unfortunate Michael Angelo de Caravaggi during a visit which he once made to the island when flying from the consequences of one of his crimes or indiscretions. He was treated with great kindness and attention, and the portrait was one of the tokens of his gratitude.

STATISTICS OF THE SILK MANUFACTURE OF GREAT BRITAIN.

THE silk employed in our manufactures is, like [illegible] wholly derived from foreign countries, whence we import it in three different states, viz., raw, waste, and thrown.

Raw silk is that form of the material which is obtained on winding off the thread of several cocoons (envelopes which the silk-worm has spun) together, passing the combined thread round a hollow frame or reel. The skeins thus obtained, are called hanks of raw silk, of which there were imported from the various undermentioned countries in 1849 (the date of the last official classified account), the following weights; viz., British India, 1,804,327 lbs.; China, 1,845,52[illegible] lbs.; Turkey, Syria, and Egypt, 318,824 lbs.; Italy, 241,048 lbs.; France, 313,016 lbs.; and from various other countries, smaller quantities amounting to 468,732 lbs.; giving a total of 4,991,472 lbs., of which 473,840 lbs. were re-exported, leaving a balance of more than 4½ millions of pounds for our home manufactures.

Waste silk is composed of the floss silk which covers the cocoons, (which is removed previous to winding off the raw silk), and of the waste obtained in the operations of spinning and throwing. Of this, there were imported in 1849, from Italy, 993,776 lbs., from France, 268,016 lbs.; and from other countries, 166,992 lbs., making a total of 1,428,784 lbs.; of which 52,976 lbs. were re-exported, leaving upwards of 1,376,000 lbs. for home consumption.

Thrown silk is the raw silk which has gone through the various operations of winding, cleaning, doubling, and *twisting* or *throwing*, and is in the state ready to be woven into silk and satins. Of thrown silk we imported in 1849, from Italy, 5,232 lbs., from France, 419,726 lbs, and from other countries, 189,812 lbs.; making a total of 614,770 lbs, of which 132,662 lbs. were re-exported, leaving a surplus of upwards of 482,000 lbs. for home use.

In the winding, spinning, and throwing of this raw and waste silk, so as to fit it for the loom, and in weaving the silk, so spun and thrown, into fabrics of various kinds, there were employed in 277 factories 42,544 people (12,667 males, and 29,877 females), of whom 2,385 are boys and 4,766 girls under 13 years of age; 3,214 males between 13 and 18 years of age; 25,111 females above 13 years of age, and 7,068 males above 18 years of age. The number of spindles employed in spinning and throwing the raw silk was 1,225,560, and the number of power looms for weaving, 6,092, these spindles and power looms being set in motion by the aid of 2,858 horse steam-power and 853 horse water-power. The counties in which these silk factories are situated are as follows, viz, in *England*—Cheshire, 97; Lancashire, 29; Derbyshire, 21, Warwickshire, 23, Yorkshire, 16; Somerset, 15; Worcester, 13; Gloucester, 7, Essex, 6; Middlesex, 4; Norfolk, 4, Devonshire 2. total, 272

In *Scotland*—Lanark, 4, Renfrew, 1 total, 5.

The numbers above given do not, however, represent the total number of people employed in the manufacture of silk goods. In some branches of the trade, as, for instance, that of ribbons, the manufacture is still, for the most part, a domestic one, the spinning and weaving being carried on in the cottages of the workpeople.

The total number of persons employed, including dyers, scourers, makers of machines, foremen, clerks, &c., may be safely estimated at not less than 70,000.

The silk manufacture exhibits another instance of the good effects which have arisen from the removal of legislative interference and protection. In 1821-2-3, when the restrictive system was in full vigour, the raw and thrown silk imported did not exceed 2,329,000 lbs., whilst that of 1850 amounted to 7,159,134 lbs., or *more than treble.*

The total quantity of raw and waste silk imported in 1851 was 6,184,532 lbs., and 412,636 lbs. of thrown silk, making a grand total of 6,597,168 lbs, from which, if we deduct 712,587 lbs. re-exported, we obtain a net total of 5,884,581 lbs., and if we reckon 250 cocoons to the pound, we find that the labours of no fewer than 1,471,145,260 silkworms were requisite to spin the silk required for our manufactures.

Whilst our importation of cotton manufactured goods is comparatively trifling, that of manufactured silk goods amounts to a considerable sum, the weight of those imported from France and other parts of Europe in 1851 being 583,098 lbs, and the silk goods of Indian manufacture 444,723 lbs.; a large proportion of the Indian silks are re-exported, as well as some portions of the Continental silks. We have no means of ascertaining the quantity or value of silk goods annually manufactured in this country. In 1851, we exported British manufactured silk goods to the amount of £755,962, and of silk mixed with other materials, £378,969. Silk yarn and thrown silk of the value of £196,438 were also exported.

THE SCIENCE OF SHELLS.

Concluded from page 87.

THOUSANDS will acknowledge that it is delightful, on a summer's morning, or when the heat of mid-day is passed, to wander along the beach, and to inhale the invigorating breezes of the ocean. But the number of those is not equally great who attentively examine the various objects to be found there, so full of interest, some of which are strikingly exhibited in the following page. There, amidst the marine plants left by the retiring waters, the star-fishes, and other beings too numerous to name, may be often observed those shell-covered creatures who are once more to engage our attention.

The opposite engraving, in which the sea appears rising upon them, may suggest also the vast variety that is found beneath its waters, serving to recall the words of the poet:—

"The floor is of sand, like the mountain drift,
  And the pearl-shells spangle the flinty snow;
From coral rocks the sea-plants lift
  Their boughs, where the tides and billows flow.

The water is calm and still below,
  For the winds and waves are absent there;
And the sands are bright as the stars that glow
  In the motionless fields of the upper air.

There, with its waving blade of green,
  The sea-flag streams through the silent water
And the crimson leaf of the dulse is seen
  To blush like a banner bathed in slaughter.

There, with a light and easy motion,
  The fan-coral sweeps through the clear deep sea;
And the yellow and scarlet tufts of ocean
  Are blended like corn on the upland lea.

And life in rare and beautiful forms
  Is sporting amid those bowers of stone,
And is safe when the wrathful spirit of storms
  Has made the top of the waves his own."

Among the mollusks not yet noticed, is the Cockle (fig. 1, page 182), having a foot which is employed extensively for progressive motion, as well as for concealing itself in the mud or sand. It can also advance at the bottom of the sea, along the surface of the soft earth, pressing backwards with this organ, as a boatman impels his boat onwards by pushing with his pole against the ground in a contrary direction. These mollusks are easily dug up by women and children with a small spade; they are sold by measure, and eaten either raw, boiled, or pickled. They are in season during March, April, and May, and are considered in this country as wholesome food, whilst they are but little regarded in France.

To the various operations of the mantle of mollusks a reference has already been made, and of one we are now particularly reminded. For sometimes a sudden development occurs in particular parts of the mantle, at different periods, striking out into long slender processes. Hence arise some very remarkable peculiarities. For as every part of the surface of these processes can secrete and form shell, so the portion of it which is consolidated around each process must have at first the shape of a tube closed at the end. As, too, fresh deposits are made by the portion of the mantle inside the tube, so it retires to make way for the additions to the internal space. And at length, the cavity being entirely filled up, the additions to the shell, at first a tube, become entirely solid. The many curious projecting cones or spires of some shells, and which have risen periodically during their growth from their outer surface, have precisely such an origin. A remarkable instance of this occurs in the *Spondylus* (fig. 2, p. 182).

THE RETIRING WATERS.

The body of the oyster (fig. 3, p. 182), is so placed in the shell, that the extremity at which the mouth is found is situated in its narrowest part, namely, the hinge. The general form of the body is oval, and wider at one extremity than the other with one of its sides considerably flattened. The mantle has a double row of fringes on each of its lobes, those on the outer lobe being the shorter. The sense of feeling appears to be very acute in this part of the structure, warning the creature of the least approach of danger; these fringes being retracted by means of a series of extremely fine muscles. Immediately behind the opening of the mouth, there is a kind of bag, which answers the purpose of a stomach, and if cut open will show the apertures of several vessels, by which the bile is conveyed from the liver—a greenish mass which surrounds the stomach on all sides.

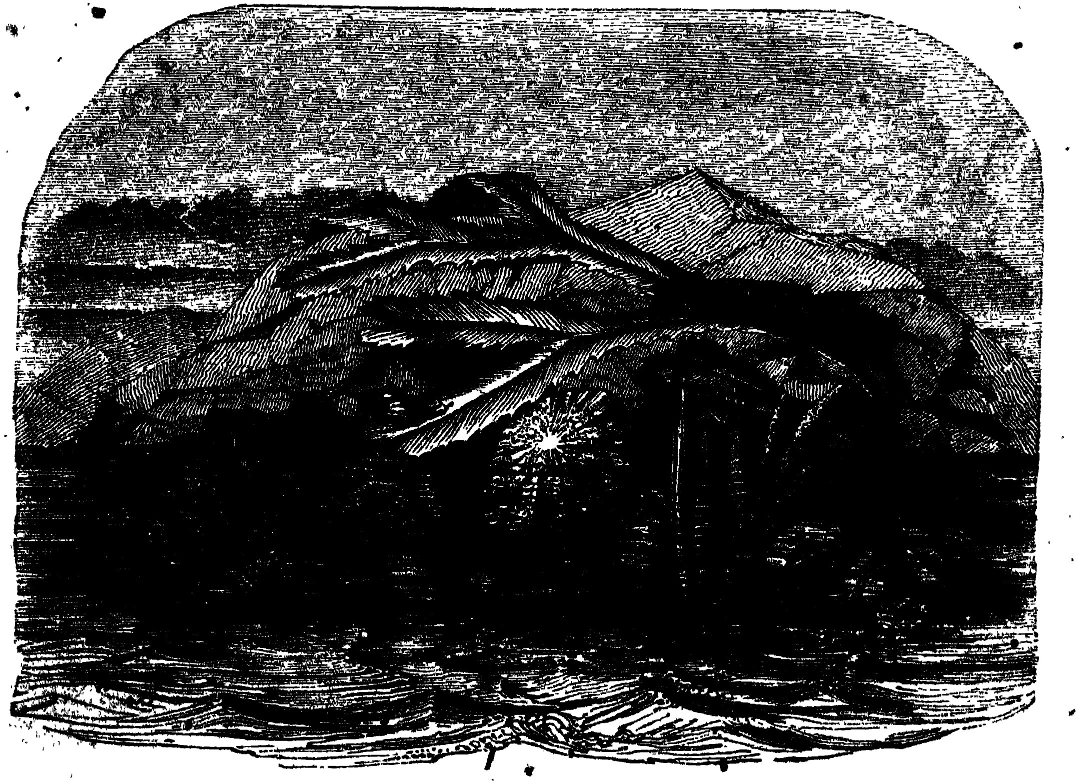
Mr. Jesse mentions his being informed by an observant and veracious person, that during a visit to America, his admiration was excited by the ways of Providence in the formation of oyster-banks on the seabord of Georgia. The land from sea, after about the space of from twelve to eighteen miles, is completely alluvial, and in general consists of uncultivated marsh lands, through which an iron rod might be thrust to the distance of eighteen or twenty feet.

A great number of large creeks and rivers are found meandering through these marshes, and owing to the sinuosities invariably resulting from running water, the bends of these rivers would, in a short time, cut away the adjoining land to such an extent as would make the whole seabord a quagmire. But it is a remarkable fact, that wherever the tide bends its force, its effects are counteracted by walls of living oysters, which grow upon each other from the beds of the rivers to the very verge of the banks. These mollusks are often found in bunches among the long grass, growing upon the surface of the soil. They are in such abundance, that a vessel of a hundred tons might load herself in three times her own length. These banks are the favourite resort of fish and birds, as well as of the racoon, and some other animals, which feed upon the oysters by day and night. Bunches of them, sufficient to fill a bushel, are found matted, as it were, together; and the neighbouring inhabitants and labourers will light a fire upon the marsh grass, roll a bunch of oysters upon it, and then eat them. This barrier of oysters, like rocks of coral, must offer the strongest resistance to the force of the tide.

The shell of the *pinna ingens* is said to be often two feet long, and the threads which it produces are scarcely inferior in beauty and fineness to those of the silk-worm. Separately they possess but little strength, but their great number is amply sufficient to secure the creature in a fixed and suitable situation.

A little crab lives in the shell of the pinna, and "pays her," as an old writer remarks, "a good price for his lodging." It has red eyes, and very acute sight, and no sooner does it observe a cuttle-fish at hand, than it warns the pinna of its approaching foe. It surely must be placed among "the curiosities" of natural history, that—

"One room contains them, and the partners dwell
Beneath the convex of one sloping shell;
Deep in the watery vast the comrades rove,
And mutual interest binds their constant love.
That wiser friend the lucky juncture tells
When in the circuit of his gaping shells
Fish, wandering, enter; then the bearded guide
Warns the dull mate, and pricks his tender side;
He knows the hint, nor at the treatment grieves,
But hugs the advantage, and the pain forgives;
His closing shell the pinna sudden joins,
And 'twixt the pressing sides his prey confines.
Thus fed by mutual aid, the friendly pair
Divide their gains, and all their plunder share."

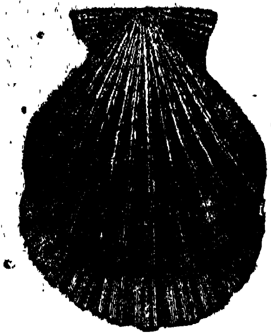


THE RISING WATERS.

In all the bivalves, of which we have given several specimens, there is a general resemblance. The two portions of the shell are united at the back by a hinge-joint, often very artificially constructed, having teeth that lock into each other; and the mechanism of this articulation varies much in different species. The hinge is secured by a substance of great strength. During the life of the animal, the usual and natural state of the shell is that of being kept open for a little distance, so as to allow of the ingress and egress of the water necessary for its nourishment and respiration.

The adductor muscles alluded to in the previous paper, have great force, so that the shells may be rapidly closed, and kept also, firmly adhering, as a security against danger. Nor is this all: for it was long since observed that some of these mollusks have a power of locomotion by suddenly closing their shells, and thereby expelling the contained water with a degree of force, which, by the reaction of the fluid in the opposite direction, gives

Fig. 1.



The Cockle.

a sensible impulse to the heavy mass. The singular fact has also been noticed that oysters which are attached to rocks, occasionally left dry by the retreat of the tide, always retain within their shells a quantity of water sufficient for respiration, and that they keep the valves closed till the return of the tide; whereas those oysters that are taken from greater depths, in which the water never leaves them, and are afterwards moved to situations where they are exposed to these vicissitudes, of which they had no previous experience, improvidently open their shells after the sea has left them, and by allowing the water to escape, soon perish.

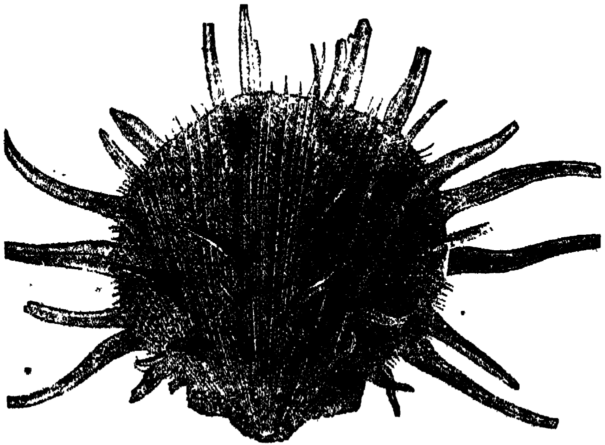


Fig. 2.—The Spondylus.

The third order of headless mollusks is formed of some who are destitute of the power of locomotion. They are attached to foreign bodies, are furnished with two long arms, and are known as the *brachiopods*, or *arm-footed*. The species now existing are very few, and some of them have been brought up from depths of from sixty to ninety fathoms. Their respiration and nutrition under the pressure of such a depth of sea-water, as Mr. Owen remarks, “are subjects suggestive of interesting reflection, and lead one to contemplate with less surprise the great strength and complexity of some of the minutest parts of the frames of these diminutive creatures. In the unbroken stillness which must pervade those abysses, their existence must depend upon their power of exciting a perpetual current around them, in order to dissipate the water already laden with their effete particles, and to bring within the reach of their prehensile organs the animalcules adapted for their sustenance.”

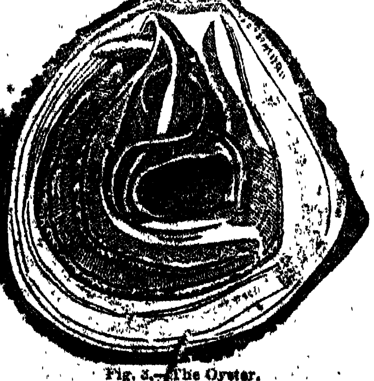
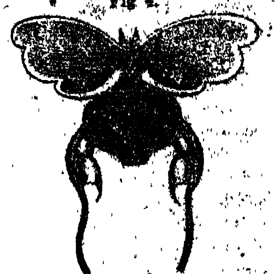


Fig. 3.—The Oyster.

We proceed, now, to glance at the second class of mollusks—those which are provided with a head. In the first order are placed the little creatures which are furnished with two membraneous expansions, like fins, or wings; and hence they take the name of *wing-footed*. Of these the hyalæa is an example (fig. 4.) The best known of them, however, is the *clio borealis*, about an inch in length, yet so abundant in the Arctic Seas as to form an important supply of food to the whale, and to colour the surface of the ocean for leagues. Its head is enveloped in a mantle, which can be retracted at pleasure, so as to expose the mouth, which is surrounded by three conical appendages. Each of them, when examined by the microscope, is seen to be regularly and numerously covered with red points, which are proved to be distinct, transparent cylinders, sheathing about twenty minute suckers, capable of being protruded, and acting as organs for seizing and retaining prey. It has been calculated that the total number of these suckers on the head of a single clio amounts to 360,000—“an apparatus for prehension,” as Professor Rymer Jones remarks, “perhaps unparalleled in the creation.”

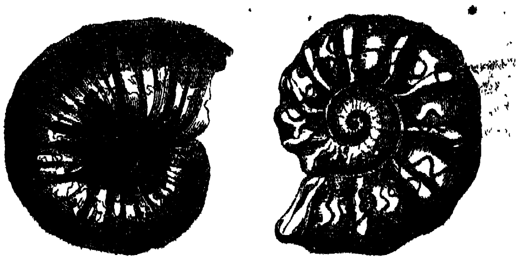
Fig. 4.



The Hyalæa.

The *gasteropods*, or *belly-footed* creatures, form the second order of the mollusks which have heads. Of these there is a great variety. The common snail furnishes a familiar specimen of them, for as it crawls along it may be observed that the only organ it possesses as a substitute for legs is a broad muscular disc, forming the lower surface of the body. But a particular description of the creatures that belong to this order would far exceed our present limits. It must be remarked, however, that some of them are known only in a fossil state. Such is the ammonite, of which we give two representations; the strength of the shells will be at once apparent (fig. 5.)

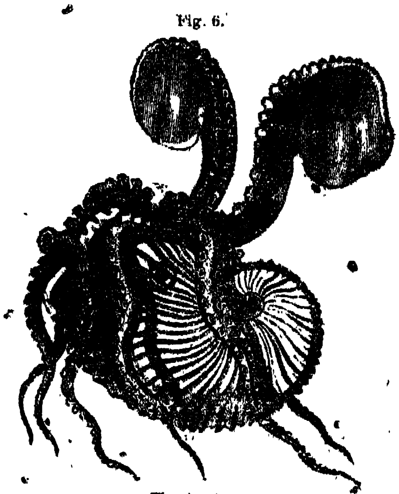
Fig. 5.



Ammonites.

The most remarkable specimen of the third order is the argonaut, or nautilus, respecting which much has been written, and of which we first give the ordinary representation (fig. 6). To it poets have repeatedly referred. Thus Montgomery says in his “Pelican Island:”—

Fig. 6.



The Argonaut.

“Light as a flake of foam upon the wind,
Keel upwards, from the deep emerged a shell,
Shaped like the moon ere half her horn is filled;
Fraught with young life, it righted as it rose,
And moved at will along the yielding water.
The native pilot of this little bark
Put out a tier of oars on either side,
Spread to the wafting breeze a two-fold sail;
And mounted up and glided down the billow
In happy freedom, pleased to feel the air,
And wander in the luxury of light.”

Byron's description of it is equally beautiful. As he portrays the "Mutiny of the Bounty," he says:—

"The launch is crowded with the faithful few,
Who wait their chief, a melancholy crew;
But some remained reluctant on the deck
Of that proud vessel, now a moral wreck—
And view'd their captain's fate with piteous eyes;
While others scoff'd his anguish'd miseries;
Sneered at the prospect of his pigmy sail,
And the slight bark so laden and so frail.
The tender Nautilus, who steers his prow—
The sea-born sailor of his shell canoe—
The ocean Mab—the fairy of the sea—
Seems far less fragile, and, alas! more free.
He, when the lightning-winged tornadoes sweep
The surge, is safe—his port is in the deep—
And triumphs o'er the armadas of mankind,
Which shake the world, yet crumble in the wind."

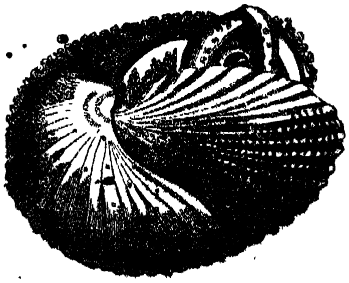
It has even been supposed that this little creature, putting out its oars, and spreading its sail to the wind, first suggested to man the idea of navigating the waters. Such was the idea of Pope, when he said:—

"Learn of the little nautilus to sail;
Spread the thin oar, and catch the driving gale."

But we have in such representations, often to the production of beautiful pictures, imagination only, and not reality. The fact is, that from the days of Aristotle the history of the creature referred to has been enveloped with a tissue of errors. The means for their detection have been at hand, but they have not been employed. The opportunities for putting an end to the prevailing assumption have been numerous, but they have not been made available.

It remained for a French lady, Madame Power, residing in Sicily, to give us a just description of the nautilus (fig. 7). She has shown, among other things of great interest, that the shell, while investing the living animal, is not hard as we see it in cabinets, but soft, yielding, and flexible, with sufficient elasticity for the respiratory functions, and the degree of locomotion required by its inhabitant. It is also permeable by light. It has been proved, moreover, that the embryo of the nautilus, while yet in the egg, and at an advanced period of development, has neither arms nor shell; but that both become developed at a given time, namely, ten or twelve days after extrusion. It was further discovered that the inhabitant of this shell possesses the power of repairing it when fractured, or when portions were removed for the purpose of experiment, and with the same matter as that of which the shell consists; that the shell is moulded on the body of the animal, to the form of which it is beautifully adapted; that, in every instance, the animal retains the same relative position to its shell; and that the result of removing the shell is an immediate loss of vital power, which is soon followed by death.

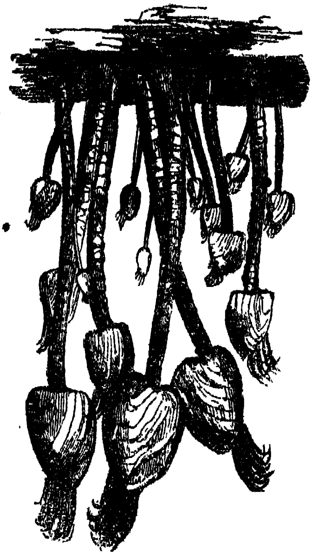
Fig. 7.



The Nautilus.

Madame Power describes the arms as being placed next to the involuted spire of the shell, over which they are bent, and expanded forward so as to cover and conceal the whole of the shell, and from which they are occasionally retracted by the living creature. She states, also, that these expanded membranes are the organs of constructing, and subsequently repairing the shell. The accuracy of this lady's description has been confirmed by M. Rang. Professor Owen has published a valuable memoir of "The Pearly Nautilus," founded on a minute anatomical investigation of one brought to England by George Bennett, Esq., F.L.S. In his note, made at the island of Erromanga, he says:—"In the evening a pearly nautilus was seen in Marekini Bay floating on the surface of the water, not far distant from the ship, and resembling, as the sailors expressed it, a dead tortoise-shell cat in the water."

Fig. 8.



Barnacles.

Another marine animal is the barnacle, often found attached to rocks, stones, keels of ships, and masses of floating timber, torn off from vessels that have been wrecked. This attachment is made by a fleshy stem; and sometimes a large mass of barnacles may be observed together. On examining one of them, it is found to consist of a body, inclosed within fine shelly valves, spread on a tough membrane, by which they are united. It has arms covered with a slightly horny vestment, and furnished at each joint with hair-like appendages, forming a sort of fringe. While the barnacle is on the watch for its prey, these arms are protruded, and together with their fringes, which are in constant motion, serve the purpose of a sweeping-net. The delicacy of touch with which these organs are endued is extreme, and the instant some minute being is touched, it becomes entangled in their folds, is carried to the mouth, and, being crushed by the jaws, is transferred to the stomach (fig. 8).

Among the uneducated on the shores all of the European seas the curious error prevails, that the barnacle contains the young of a species of goose, which was thence called the Barnacle goose. Nor have the educated been free from its influence. The following notice was not only sent by Sir Robert Moray to the Royal Society, but actually printed by them in their "Transactions:"—"The pedicle seems to draw and convey the matter which serves for the growth and vegetation of the shell, and the little bird within it. In every shell that I opened I found a perfect *sea-fowl;* the little *bill* like that of a goose; the *eyes* marked; the head, neck, breast, wings, tail, and feet formed; the *feathers* everywhere perfectly shaped, and blackish coloured; and the *feet* like those of other water-fowl, to my best remembrance. Nor did I ever see any of the little birds alive, nor meet with anybody that did; only some credible persons have assured me that they have been seen, some as big as the fist." It is strange that men of intelligence should be so deceived, but those who can examine the *real* history of the Barnacle, will find it extremely curious.

But here our limits constrain us to pause. Spenser exclaimed:—

"O, what an endless work have I in hand,
To count the seas abundant progeny!
Whose fruitful seede far passeth those in land,
And also those which roame in the azure sky;
And much more earth to tell the starres on hy,
Allbe they endless seem in estimation,
Than to recount the seas posterity
So fertile be the floods in generation,
So huge their numbers, and so numberlesse their nation."

At some remarkable objects, however, we have had an opportunity to look; and we can promise our readers who will pursue the subject, much pleasure as well as instruction in so doing. All we can do is to point out the path, and to urge them onward.

JEAN BAPTISTE OUDRY.

Oudry was a French painter of the eighteenth century, and, although far above mediocrity, his works have never been so highly valued in England as amongst his own countrymen. His paintings on historical subjects are very numerous, but it is to his paintings of animals and scenes connected with the chase that he owes most of his celebrity; he was, in short, the French Landseer. He was born at Paris on the 17th of March, 1686. His father was a painter and picture dealer besides, which gave the boy a taste for art; but it was Michael Serre, a Provençal painter, who gave him his first lessons. Young Oudry was placed in his studio when eighteen years of age. Serre was just the man to instruct him; ardent, imaginative, and enthusiastic.

J. B. OUDRY; FROM A DRAWING BY BOCOURT.

After his departure from Paris, he connected himself with Largillière, and from him acquired that excellence in the mixing of colours for which he was so distinguished. After his election as one of the professors in the Royal Academy of Painting, he made a graceful acknowledgement in his opening address of how much of his proficiency he owed to the able instructions of his old master. Peter I. of Russia visited Paris about this time, and Oudry painted his portrait; and so pleased was the Czar with the likeness, that he insisted on his accompanying him to Moscow; and to escape from his importunity, the artist was obliged to hide himself until he had taken his departure.

His earliest ambition was to be successful in historical painting, but it soon became apparent, notwithstanding the success of some of his efforts, that his forte did not lie on this. He often repeated in after life the prophecy of Largillière, *Tu ne seras jamais qu'un peintre de chiens*—"You will never be anything but a painter of dogs." Before the revolution of 1793, all the royal residences in France—Versailles, Choisy, Marly, Compiègne, Chantilly, &c., contained many of his works, and, in fact, he was more essentially the chief painter to the king than Charles Vanloo himself. He was greatly admired by various other European sovereigns. He was invited to the Danish court, and the Prince of Mecklenburgh erected a gallery specially for the reception of his pictures. The French monarch was, however, successful in retaining him. He assigned a suit of apartments in the *Cour des Princes*, in the Tuileries, and settled a liberal pension upon him. His duties were to follow the king whenever he went out stag-hunting, so that he might sketch from nature; and a stud of horses were set apart for his sole use. For much the same purpose Vander Meulen accompanied Louis XIV. through his campaigns in the Netherlands.

At the revolution, collections of his paintings, which were found in all the royal palaces, were broken up and scattered far and wide. In the Louvre but few of his works are to be found, and these are surpassed in number and importance by those of Desportes, although no picture of Desportes', taken singly, can equal "The Dog and Heron," from which our engraving is taken. This is Oudry's *chef d'œuvre*. All his principal works are now at Fontainebleau. There are there two rooms, known as the *Salons des Chasses*, and in these his four finest paintings may be seen—"The Hunters' Rendezvous," in which Louis XV. is seen giving his orders to De Nestier, his huntsman; "Louis XV.

Hunting in the Forêst of Compiègne;" and the same prince "Hunting among the Rocks of Franchard." In the last, Oudry has painted himself. It is in the execution of these great autumn landscapes, filled with packs of hounds, animated groups of huntsmen, and mounted courtiers, that Oudry gives the highest proofs of his skill, and establishes his claim to be considered beyond all doubt the painter of the chase *par excellence.*

A rather singular mistake was made in connexion with some of these paintings. In the Louvre may be seen copies of nine of them executed upon porcelain by the best artists of the Royal Manufactory at Sèvres. When Louis XVI. succeeded his grandfather, he showed himself passionately fond of the chase, and the artists, wishing to compliment him, substituted his portrait for that of Louis XV. as painted by Oudry, leaving the costume and all other parts of the figure still the same. When we consider the fickleness of fashion in matters of dress in the proverbially fickle land of France, we may form some idea of the incongruity which the alteration must have presented at the time.

DOG AND HERON; DRAWN BY FREEMAN FROM A PAINTING BY OUDRY.

Oudry was an extraordinarily prolific painter, so that there are few amateurs in any part of Europe who do not possess some of the productions of his pencil. Many of them have been engraved by Sylvestre, Lebas, Daullé, and Basan. Amongst the best of these is a "Spaniel catching a Wild Duck," and some other works of a similar nature, which have been greatly admired for the delicacy and truthfulness of their execution and finish. We are assured by some of his contemporaries that he could hardly ever be induced to devote even the afternoon to pleasure or amusement of any kind. His brush and palette were ever in his hands. He painted almost without cessation, occupying himself frequently, however, in drawing from nature. His evenings were sometimes devoted to the sketching of studies, many of which are still in the hands of amateurs. He made a great many journeys to Dieppe for the purpose of painting fish while in a state of freshness, immediately after having been taken out of the water. It is said that, whenever he commenced a landscape, he pitched a tent on the spot, and lived in it until the work was finished, or, at least, was in an advanced state;—so that it has been alleged, and not without truth, that some of his sketches on grey paper of hedge-rows, trees, and the appearances of rural scenery at sunrise, are amongst his best efforts. He was possessed of great powers of observation and accuracy of perception. In some of his pictures of the chase not only are the prominent personages faithful portraits, but the dogs of the royal kennel were so faithfully rendered, that the king was able to recognise each without difficulty;—so that all the favourite dogs of Louis XV. have their portraits hanging up at the Louvre. The king took a singular pleasure in seeing Oudry paint the partridges, pheasants, &c., which himself he had killed.

He was not less excellent as an engraver than as a painter, and it is said that some of his achievements in this way will not suffer by comparison with those of any age. He drew a number of designs to illustrate the fables of La Fontaine, but, unfortunately, they have all been lost.

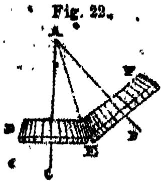
Louis XV. took good care to reward his painter, and, had all the favours of this imbecile monarch been equally-well bestowed, it might have done much to postpone or mitigate the horrors of the revolution which followed so soon upon his death. He appointed him first director of the Gobelin Manufactory, and then of that of Beauvais. In both these establishments his chief paintings have been copied on tapestry with rare skill and faithfulness. All the portraits which have remained to us of Oudry represent him as rather stout and corpulent—even that which he himself painted in the chase scene. In 1795 he suffered from an attack of apoplexy and paralysis, both at the same time, and, on his partial recovery, he found, to his great chagrin and disappointment, that his hands had become so powerless that he could no longer hold pencil or brush. Three months afterwards he determined upon going to Beauvais, hoping that the air of the place would restore him; but he died there shortly after his arrival, in April, 1795, in the sixty-ninth year of his age, leaving behind him one son, who had been his pupil, and had been received into the Royal Academy during his lifetime.

KINEMATICS;

OR THE TRANSFORMATION AND REGULATION OF MOTION.

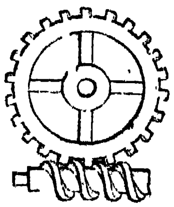
(*Concluded from page* 119.)

Fig. 22.



THE transmission of motion between two axes of rotation A B, A C, fig. 22, which form a certain angle in the same plane, is effected by means of conical or bevel geering. The primitive cones are generated by the angles E A D, E A C; so that the perpendiculars drawn from any point in A E to the axes A B, A C, are in the inverse ratio of the angular velocities, or of the numbers of revolution of the wheels D E, E F.

Fig. 23.



When the axes are not in the same plane, but are at right angles to each other, the geering takes the form of a toothed wheel working into an endless screw, as represented in fig. 23.

The universal joint invented by Dr. Hooke is adapted for transmitting motion from one axis to another, although not in the same plane, and even variable in position. It consists of a cross, of which the four arms are equal; their opposite extremities are jointed to the extremities of two semi-circles, whose convex summits are fixed to the ends of two moveable axes, and whose concavities are turned towards each other. By this construction, one of the axes cannot turn without the other turning also on itself. When the angle formed by the two axes is less than 140 degs., a double joint must be employed, as represented in fig. 24.

Fig. 24.

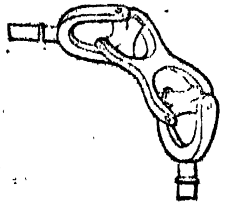
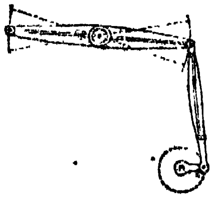
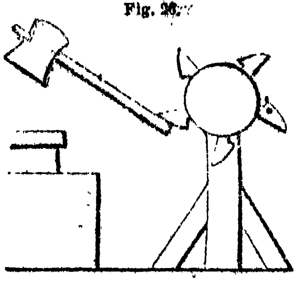


Fig. 25.



To change a continuous circular motion into an alternate circular one.—A connecting-rod attached at one of its extremities to a working-beam, and at the other to a crank, transforms the alternate circular motion of the former into the continued circular motion of the latter, as represented in fig. 25. The sun and planet-wheel, invented by Watt for his earlier steam-engines, is another example of this transformation.

Fig. 26.



[illegible] is also effected by a wheel having wipers on its circumference, which successively raises and drops a sledge-hammer with great velocity by its continued motion, thus giving every part of the latter a reciprocating circular motion round its axis, as represented in fig. 26.

The pedal and wheel of the knife-grinder, and the lever of *Lagarousse*, represented in figures 27 and 28, are other examples of this transformation. In the latter, continuous motion is given to a wheel and axle by the alternate motion of the arms of a lever.

Fig. 27.

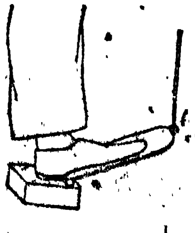
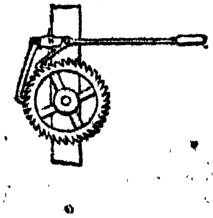
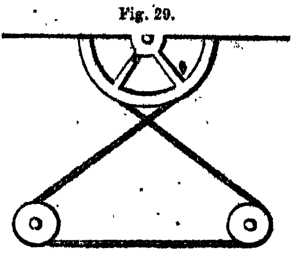


Fig. 28.



To change an alternate rectilinear motion into an alternate circular one.—A lever and half-wheel turning on an axis, to the latter of which is attached an endless cord passing over two pullies in the same plane with it, will give an alternate rectilineal motion to any point in the cord, when alternate circular motion is given to the lever and half-wheel, as represented in fig. 29.

Fig. 29.



The apparatus called *lazy-tongs*, represented in fig. 30, used for children's toys, has been employed for this transformation of motion, but only on a limited scale, for want of strength in the parts.

Fig 30.

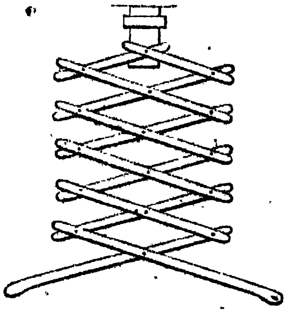
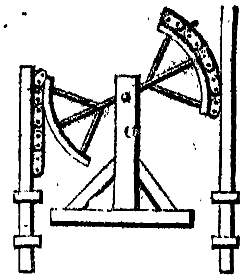


Fig. 31.



By means of two chains attached at their lower extremities to two vertical rods, and at their upper extremities to two arched heads of a working beam, as in Newcomen's atmospheric and Watt's earlier steam-engines, fig. 31, the alternate circular motion of the latter is transformed into the alternate rectilinear motion of the former.

The jointed parallelogram of Watt, called the "Parallel Motion," represented in fig. 32, gives a very close approximation to the solution of this problem. A B is a working-beam turning on the axis A. I is another fixed point. The rods B C, C D, D E, and D F, are all moveable on the pivots B, C, D, E, and I. When the beam receives an alternate motion of rotation round its axis A, the parallelogram assumes a variety of shapes, and the point C tends to describe a curve of which the complete form is indicated by the dotted line resembling the figure 8. But this curve differs very little from a vertical line C R within the limits of the motion of the beam; so that the rod C R takes an alternate motion very nearly vertical.

Fig. 32.

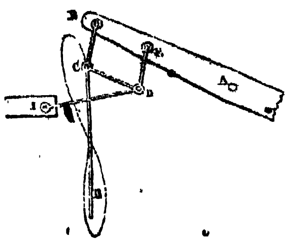
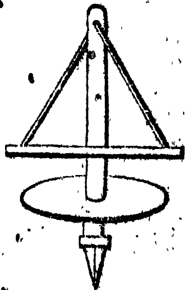


Fig. 33.



The drilling machine represented in fig. 33, is another example of this transformation. It is a wheel which moves round an axis or spindle, and also longitudinally on it, by the twisting of a rope fastened to the opposite extremities of its diameter, and passing through a hole at the top of the spindle; the spindle is furnished with a fly to continue and give concentrated force to the motion at the moment required. The common drill-bow is another example of this species of motion.

To change one alternate circular motion into another.—This may be effected by the same transformations that convert one continuous circular motion into another. It is also effected by some species of turning-lathes, and bell-crank-work, represented in figures 34 and 35; and the motion of the latter is not limited to the same plane, as indicated in fig. 36.

Fig. 34.

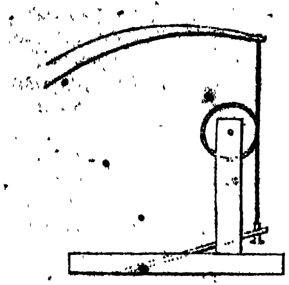


Fig. 35.

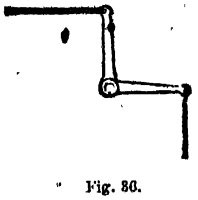
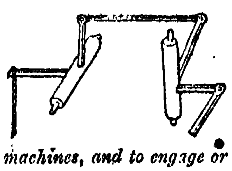
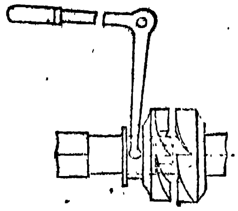


Fig. 36.



To modify the velocity of motion in machines, and to engage or disengage machinery.—The simplest mode of suddenly suspending or restoring motion in a machine consists in throwing one of the wheels, as the driver, out of or into geering, by making it moveable in the longitudinal direction of the common axle of the driver and the follower; the teeth of the former may thus be either disengaged from those of the latter, or re-engaged with them, at pleasure, by its alternate motion on the axle. Fig. 37 is a representation of this method.

Fig. 37.



The motion of one of the wheels round the common axle can likewise be so regulated, that it shall only transmit its motion to the axle when acted on by means of a handle, as represented in fig. 38.

Fig. 38.

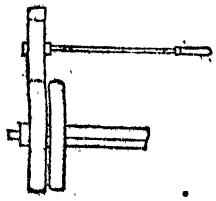
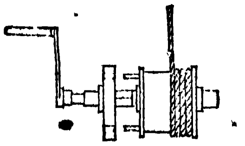


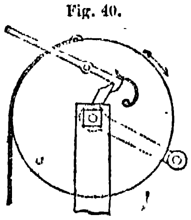
Fig. 39.



When the force to be transmitted or retarded is very considerable, the apparatus for engaging or disengaging the wheels is modified in the manner represented in fig. 39.

The apparatus called detent-wheel, represented in fig. 40, is composed of an axle, worked by a winch, and carrying a projecting pin. On the same axle is fixed a friction-wheel, which carries a detent, or latch, formed of a hooked lever, acted on by a spring. When the hook is locked on the projecting pin of the axle, motion is communicated to the wheel by the winch, which raises a cord fastened to its circumference, and loaded with a weight. The motion is continued until the lever, meeting the extremity of a fixed pin, turns over and relieves the hook, when the weight descends, and produces motion in the wheel.

Fig. 40.



Of the different kinds of apparatus for engaging and disengaging machinery, the tongs or catches employed in pile-driving engines are the most simple. A variety of these is represented in figs. 41 and 42. They consist of one or two bent levers, retained in their position by springs, and furnished with hooks, by which the ram or hammer is suspended; as soon as they are elevated to the required height, their upper extremities come in contact with fixed pins, which press upon the springs, release the hooks, and permit the ram to fall.

Fig. 41.

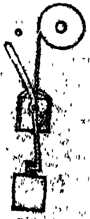
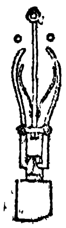
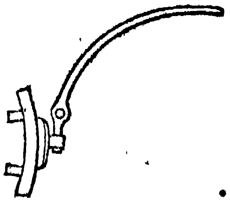


Fig. 42.



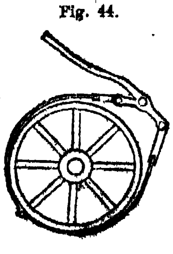
A break is an apparatus for moderating at pleasure, or annihilating entirely, the velocity of any machine in motion. The most common examples are those employed to hinder the rapid descent of carriages down an incline, or to stop a railway train at a station. Fig. 43 represents a break composed of a circular piece of wood or metal, placed behind one of the great wheels, so that it can be pressed against it by means of a screw, which communicates with a handle by an endless cord. This handle is placed within reach of the platform on which the conductor stands, so that he can stop the carriage without leaving his place.

Fig. 43.



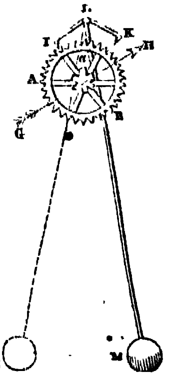
This kind of break has the serious defect of exerting a pressure on the axle, which tends to twist it and force out the bolt. Fig. 44 represents a method free from this defect. The break is composed of two circular pieces of metal, symmetrically placed on the wheel with relation to its vertical axis, so that they can be fastened completely round the wheel, and employed to stop its motion, without exerting any pressure on the axle. This plan has been employed on railways with great advantage. Applied to the two wheels of the same pair of a carriage, it almost instantaneously causes their rotation to cease, and surely and promptly stops a train running with great velocity, without occasioning a violent shock, or a sudden transition from motion to rest.

Fig. 44.



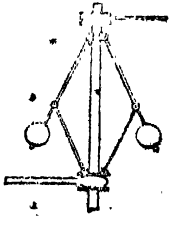
The anchor escapement, represented in fig. 45, is used for regulating the motion of a clock. The escapement-wheel, A B, which carries the seconds'-hand, G H, tends to revolve from A to B with an accelerated velocity, in consequence of the action of the weight. L M is a pendulum, which oscillates round the point of suspension, L, and is such that it makes one oscillation while the seconds'-hand, G H, advances one-sixtieth part of the dial's circle. The pallets I and K make one piece with the pendulum, and, of course, vibrate with it. When the pendulum is in the position represented in the figure, the pallet I stops the motion of the wheel, A B, and the action of the moving power. But the bob M of the pendulum brings back the rod, L M, into the vertical direction by the action of gravity, and then the pallet I releases the wheel, which again revolves by that of the moving power. In the meantime the pendulum swings into the position L N, and the pallet K takes up another tooth of the wheel, thus momentarily suspending the motion of rotation, when the same operation takes place as before; so that, in two oscillations of the pendulum, one tooth escapes from each pallet, and the regularity of the motion is continued as long as the weight continues to act.

Fig. 45.



The conical pendulum, which acts by its centrifugal force, is perhaps the finest specimen of a regulator of motion. Two equal rods, equally loaded with balls at their lower extremities, and fastened by hinges at their upper extremities to a vertical axle, are made to revolve with it by the action of the machine. The variations of velocity in the motion of the axle are shown by the corresponding variations in the angular distance between the rods produced by the action of the centrifugal force of the balls. This apparatus, represented in fig. 46, has been ingeniously applied to the regulation of the prime mover, whether it be a fall of water, or steam issuing from a boiler. It is an indispensable requisite to the steam-engine.

Fig. 46.

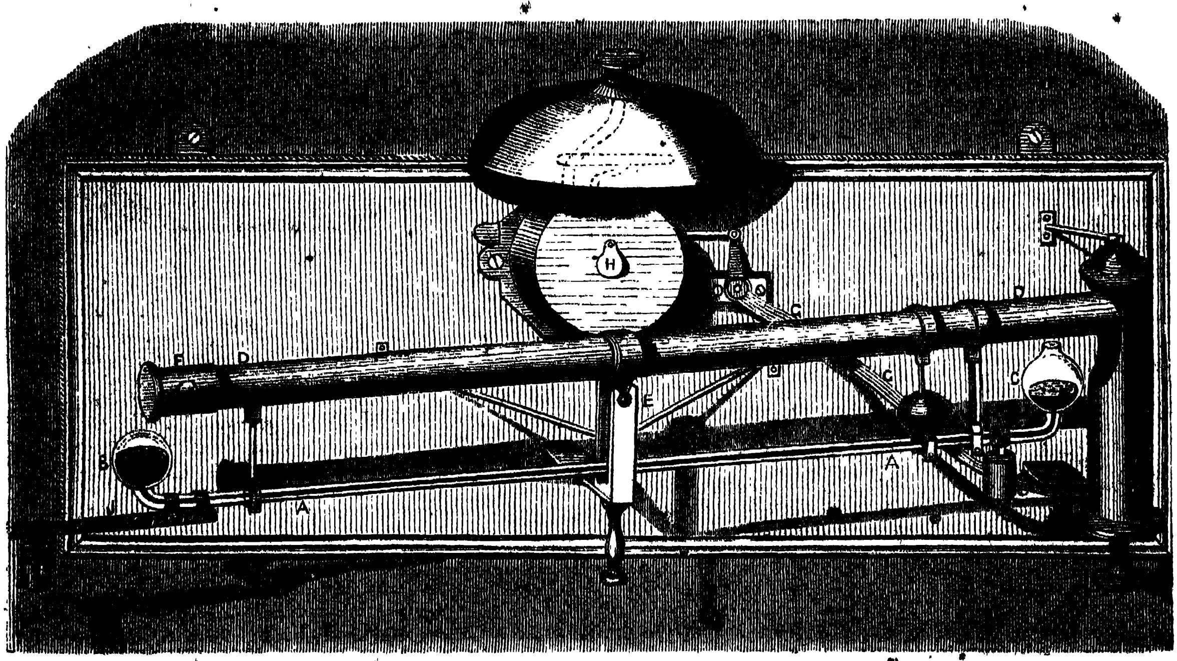


One of the most useful inventions for preventing the variations is well known by the name of a fly-wheel. This wheel is so constructed as to have its ring very massive and heavy, and the spokes only of sufficient strength to support the ring. R. W.

BAKER'S THERMOMETRIC ALARUM.

That certain information respecting the actual temperature of particular places at particular times is a real desideratum, the increasing manufacture and use of thermometers amply proves. But there are occasions and circumstances where there exist the greatest need for accurate information on this point, and at the same time a possibility of the information furnished by a thermometer being unnoticed or disregarded.

To render the aid furnished by a thermometer more available, and to increase in a remarkable degree the utility of such an instrument, Mr. Baker has invented what he terms a Thermometric Alarum, represented in the accompanying engraving, which the following description will explain. This instrument consists of a glass tube A A, having a bulb at each end partly filled with mercury, one of which, B, also contains a small quantity of ether, the vapour of which acts as a thermometer, by forcing (when it expands by heat) the mercury into the other bulb C, which bulb is open to the external air; this glass tube, to which is fixed the brass tube D D, placed above it, being set on a balance at E, the weight by this means preponderates on the opposite end, causing the tube to change its position. The brass tube contains a ball, F which rolls down it and then falls upon a lever by liberating the clock-work H, which strikes the bell and will continue to do so for some time. A graduated scale J, is attached to the instrument, on which slides a weight, the mode of adjusting which being the same as that of a steelyard.



THERMOMETRIC ALARUM—SHOWN AT THE GREAT EXHIBITION BY BAKER, OF HATTON GARDEN.

Thus, supposing the weight to be set at 95° on the scale, the moment the temperature of the apartment, stove, conservatory, or other place has reached the degree above indicated, and the instrument has a tendency to oscillate, the mercury in B, by its gravitation, runs instantly into the bulb C, keeping it in the lowest position, so that the ball *must* go (unless kept in its place by artificial means) and cause the alarm-bell to be rung. Instead of ether, air may be used, as it answers the purpose; but the vapour of ether is a more sensitive medium. To all persons who have valuable property at stake which would be injured or spoiled if overheated, such an instrument is invaluable. Its useful application to various purposes in the arts and manufactures will at once be obvious. In every operation or manufacture requiring a means of regulating the temperature of the drying rooms or kilns employed, such an instrument will prove of great value. The manufacturer of fine colours and of various chemical preparations often suffers considerable loss from the want of an efficient means of promptly ascertaining the least rise in the temperature of the rooms used for drying his colours and other delicate preparations, which are extremely liable to injury if the temperature of the apartment be carried beyond a given point. Nor is the beneficial application of such an instrument limited to its use in commercial operations. It may also be most advantageously employed in domestic life, in guarding the welfare of the invalid, the temperature of whose apartment may be regulated with the greatest degree of precision by the use of the Alarum, thus avoiding the ill effects resulting from an overheated atmosphere. The same advantageous result may be obtained by its employment in conservatories and hot-houses, where a slight neglect or inattention on the part of the person in charge may lead to the serious injury or even destruction of the rarest and most valuable plants; whilst, if the Thermometric Alarum be used, it will give timely warning of the fatal increase of temperature, and even call the attention of persons at some distance from the spot. Not only against damage of this kind would this instrument be a faithful monitor, but it is no less valuable as a fire alarum; for suppose it to be placed in a warehouse, store-room, or hold of a ship, and a fire breaks out unperceived, immediately the temperature becomes raised above the degree at which the apparatus is set, the alarum is instantly given, and time afforded for the prevention of any serious damage.

ART INDUSTRY.

The influence of art in manufactures has been so far extended, and has gained such power during the last few years, that many industrial branches may almost be classed among the arts. We shall not raise the question whether this influence is advantageous or not as regards the excellence or worth of idustrial products, however interesting to the artist or instructive to the manufacturer it might prove; but from time to time it is our intention to illustrate the innumerable ways in which artistic forms may be engrafted upon the practical knowledge of the present age.

We present to our readers a specimen of each of the three branches into which we intend dividing our representations of "Art Industry:"—

I.—MANUFACTURES.

The "covered earthen vase," by Ernst Marsh, of Charlottenburg, is a beautiful specimen of the articles proceeding from his manufactory, which are, almost without exception, remarkable, as well for their excellence as for the antique beauty of their designs. This vase is of red clay, in the Gothic style, is eleven inches and a half in height, and six inches in diameter. The stem is formed of three crouching gnomes, which as caryatides support the upper portion of the vase.—(Fig. 1.)

Fig. 1.

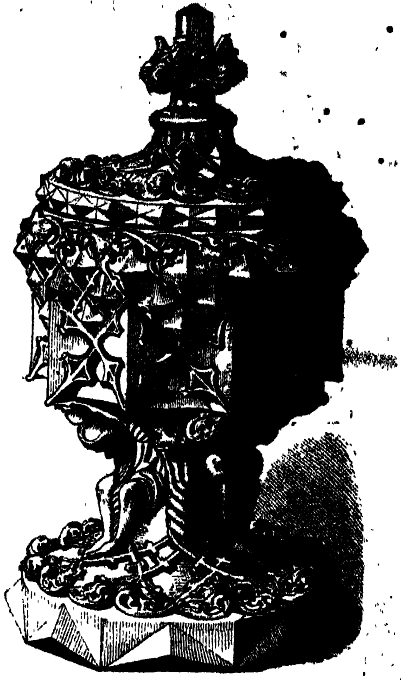


Fig. 2.

Fig. 3.

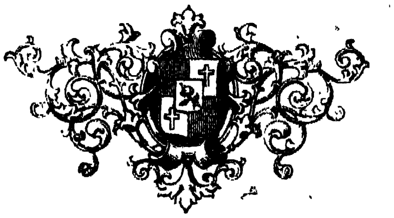


Fig. 4.

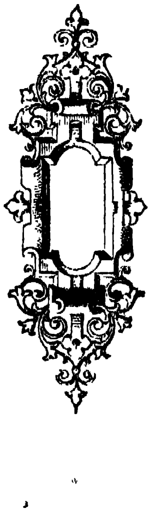


Fig. 5.

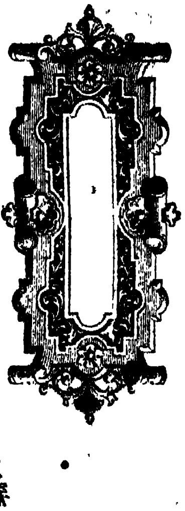


Fig. 6.

II.—DESIGNS FOR ART-INDUSTRIAL OBJECTS.

The French have only been able to gain the position of dictators of ornamental industry through that portion of their national character which impels them to regard the beautiful in an elegant and pleasing light, and to mature such ideas in a practical manner; whereas many other nations entirely neglect beauty for utility, or else overlook elegance and grace in their endeavours to be strictly antique. The French raise industry to the sphere of art, while others fear to subject art to the severe laws of common utility. This is the reason that France has so long been unrivalled in producing designs for artistic manufactures. The accompanying design for a **Toilet-stand and Mirror** (fig. 2) is a beautiful specimen of the Renaissance style, although decidedly original in design. The foot, the group supporting the shell, as well as the frame of the mirror, are to be executed in silver, and the branch [illegible] rises behind the figures and supports the glass, is to be a natural piece of coral. The shell, also, is not an imitation, but a natural specimen. Several cameos are set in the base, which add very considerably to the artistic finish of the whole. This stand is represented at about two-thirds the natural size.

III.—ORNAMENTAL DESIGN FOR MANUFACTURERS.

Under this head we shall class all minor ornaments for door-plates, picture-frames, decoration, and similar branches of manufacture.

The four engravings (fig. 3, 4, 5, 6) are designed with great freedom and taste, and are well adapted to the purpose for which they are intended.

PERSPECTIVE.

Another branch of drawing now demands our attention it is that of presenting, on a plane surface, true resemblances or pictures of objects, just as they appear to the eye from any distance or situation, real or imaginary; and to this department of art has been given the name of Perspective.

The first person who is said to have laid down any rules of perspective was an Italian named Pietro del Borgo. He supposed objects to be placed beyond a transparent tablet, and endeavoured to trace the images which rays of light emitted from them would make upon it. The book he wrote on the subject is not now extant; but on the principles it contained, Albert Durer constructed a machine by which he could trace the perspective appearance of objects.

They were also studied by Balthasar Peruzzi, to whom we owe the discovery of the points of distance, to which all lines that make an angle of forty-five degrees with the ground line are drawn. It was soon afterwards found, by another Italian, Guido Ubaldi, that all the lines that are parallel to one another, if they be inclined to the ground line, converge to some point in the horizontal line; and that through this point also a line drawn from the eye, parallel to them, will pass. A tolerably complete theory of perspective was now formed.

Subsequent geometricians made great improvements in the rules that were thus obtained, and to the labours of some of them we are laid under special obligations.

A general idea of the principles of perspective may be readily obtained by considering the plane on which any representation is to be made as transparent, and interposed between the eye of the spectator and the object to be depicted: a window, for example, will well answer the purpose. Supposing a person, then, to look through an upright pane of glass at any object beyond it, and keeping his head steady, that he draws the figure of the object upon the glass with a black-lead pencil, as if the point of the pencil touched the object itself; he would have a true representation of the object as it appears to the eye.

Other details are, however, involved in a satisfactory passing through the process which has been thus summarily described. The glass should be laid over with strong gum-water, which, when dry, will be fit for drawing upon, and will retain the traces of the pencil; and the draughtsman should look through a small hole in a thin plate of metal, fixed about a foot from the glass, between it and his eye, and he must also keep his eye close to the hole, lest he should shift the position of his head and make a false delineation of the object.

Still further: having traced the figure or outline of the object, he may go over it again with pen and ink, and when the ink is dry, put a sheet of paper upon it, and trace it thereon with a pencil; then taking away the paper, and laying it upon a table, he may finish the picture, by giving it the colours, lights, and shades, as he sees them in the object itself. In any such case the person has obtained the perspective of the objects which his view embraced; it is that which is called a *perspective plane.* From such circumstances the word perspective is derived. It is formed of two Latin words, *spectus*, a sight, and *per*, through, and means therefore, literally, "a sight through."

The *horizontal plane* is that which is parallel to the horizon, or not inclined to it; in perspective it is a plane parallel to the horizon, passing through the eye, and cutting the perspective plane at right angles.

The *horizontal line* is a straight line drawn through the principal point parallel to the horizon; or it is the intersection of the horizontal and perspective planes. If the objects are to be represented as being *below* the eye, the horizontal line must be above them; and if they are to be represented as being *above* the eye, the horizontal line must be below them. Were a representation to be made of London as seen from the top of St. Paul's, for example, the horizontal line must be higher than any of the buildings; if, on the other hand, St. Paul's, which is said to be 404 feet above the ground, were to be represented as it would appear to a person standing on the ground, about 399 feet would have to be placed above the horizontal line, and only five feet below it.

The *measures* of all base lines in the plane of the perspective are the same—that is, they are measured by the same scale, whether that be the natural size, or greater or less; and objects behind them are diminished in proportion to their distances.

The *natural size* depends on the distance of the point of sight from the centre of the picture; if that is small, the natural size of the objects will be greater than if it is large, as the nearer any object is to the eye, the larger is the *visual angle.*

The *size* of an object will be reduced to half of what it would have been, if on a base line or on the plane of the perspective, when it is as far behind that plane as the distance of the eye. Thus, were a man six feet high at the distance of twelve feet, the eye being on the same height as the centre of the body, a visual angle would be formed of rather more than 28°. At the distance of a mile, the comparative height of the same man would be less than two-tenths of an inch, and at two miles distance less than one-tenth. Perspective is divided into two branches, *linear* and *aerial.* Linear perspective has reference to the position, form, magnitude, &c., of the several lines.

The *line of distance* is a straight line drawn from the eye to the principal point of the plane.

The *point of view or of sight* is the place of the eye whence the object is viewed, and is always in the horizontal line.

The *vanishing point* is that to which all parallel lines in the same plane tend in the representation.

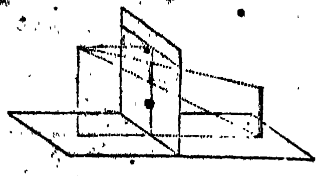
The *point of distance* is the distance of the picture, transferred upon the vanishing line from the centre, or from the point where the principal ray meets it, whence it is generally understood to be on the vanishing line of the horizon.

The outlines of such objects as buildings, machinery, and most works of human labour which consist of geometrical forms, or which can be reduced to them, may be most accurately obtained by the rules of *linear perspective*, since the intersection with an interposed plane of the rays of light proceeding from every point of such objects may be obtained by the principles of geometry. Linear perspective includes various kinds of projections. *Aerial perspective* teaches how to give due diminution to the strength of light, shade, and colours of objects, according to their distances and the quantity of light falling upon them, and to the medium through which they are seen.

A *perspective plane* is the surface on which the object or picture is delineated, or it is the transparent surface or plane through which we suppose objects to be viewed; it is also termed the *plane of projection* and the *plane of the picture*.

The perspective of a plane surface parallel to the plane of the picture changes neither its form nor direction. The perspective of a straight line remains straight. Straight lines parallel to the plane of the picture remain parallel to themselves in perspective.

Fig. 1.



The appearance of a vertical line is a line greatly vertical (fig. 1). Lines perpendicular to the plane of the picture all meet on the point of sight situated on the horizon, for these lines are in planes perpendicular to that of the picture; the point of sight in the picture is the intersection of all these planes, and consequently of all these lines with the horizontal line. All these lines being perpendicular to the same plane (see the figure), are parallel to one another.

All the lines which are found in planes, horizontal or vertical, and differently inclined as regards the plane of the picture, all tend to meet at points situated on the horizontal line; the meeting of these lines with the horizon determines these vanishing points. As an application of the principle, find the perspective of a point P, situated on the horizontal plane (fig. 2). O is the point of sight, D the point of distance; T T′ the drawing of the picture on this plane; if we draw it around this line without shifting it, the lines would be confused; to obviate this, let us have the picture shifted to M N before drawing it. If through the point P, the two lines P A, P B be drawn, the perspective of these lines being A′ O, B′ D, the perspective of the point will be at their intersection P′. It may happen that the eye may be placed so far from the picture as that the point of distance will be outside the paper on which it is proposed to make the drawing; then we must lay down on the picture from O to D only a fraction of the distance of the eye, say a third or a fourth part: and then in the drawing we must lay down only a corresponding fraction of the distance of the point from the picture. Thus, to determine the point P′, if we have taken the half of O D, we must take only the half of E.

Fig. 2.

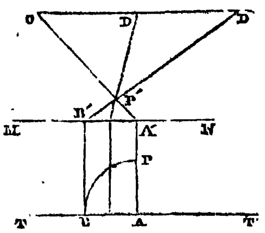
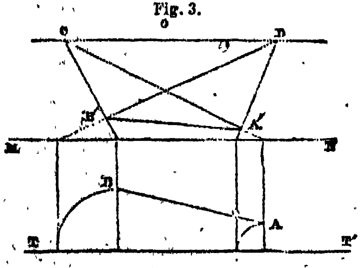


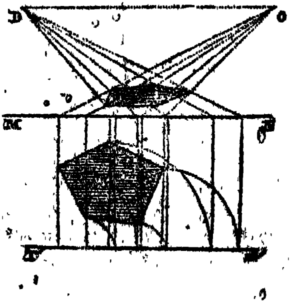
Fig. 3.



This problem necessarily helps us to find the perspective of any straight line whatsoever, drawn on a horizontal plane, for it is sufficient to find the perspective of two points on this line (fig. 3).

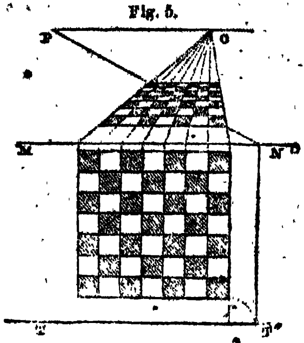
In short, it follows from this principle, that in order to put in perspective any polygon whatsoever, drawn on a horizontal plane, it will be sufficient to determine the perspectives of the vertices, and join them by straight lines (fig. 4).

Fig. 4.



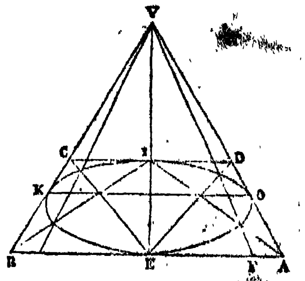
When the figures are regular, the operation may be shortened. Divide M N into as many parts as there are squares; join these points of division with the point O, the point of sight; draw the diagonal, P N, and through the points of intersection draw parallels (fig. 5).

Fig. 5.



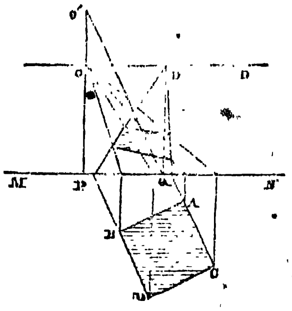
To describe a perspective circle in a perspective square, one of the sides of which is parallel to the plane of the picture. Among the numerous means which exist for solving this problem, we would point out one which is the most expeditious (fig. 6).

Fig. 6.



The perspective square is A B C D; the side A B is parallel to the plane of the picture; the point V is the point of sight. Divide A B into two parts A E, E B. Join the points E and V, and through the intersection of D C with E V at the point I, draw the diagonals I A, E D; through the intersection of these diagonals draw O K parallel to A B. These two lines, I E, O K, are the two diameters of the perspective circle. Divide A E into five equal parts, and join the points F and V. This line, V F, meets the diagonals A I, D E: the circle must pass through these two new points. By repeating the same operation on the sides I E, B C, we obtain eight points, which are always sufficient for the drawing of a circle. This figure is called an ellipse.

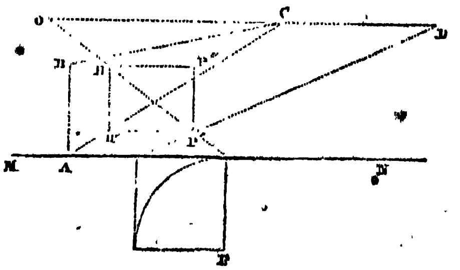
Fig. 7.



To find the vanishing point of any series of horizontal parallel straight lines (fig. 7). Through the point of sight, O, draw the vertical straight line O P and the line P O′ equal to O D, D being the point of distance. Through the point O′, draw O′ Q parallel to A C; through the point Q, draw the vertical straight line Q D′, the point D′ will be the vanishing point of the lines A C, B D, and of all others parallel to them. This very simple problem is one of the most important. We therefore advise the pupil frequently to repeat it, and to render it perfectly familiar to his mind.

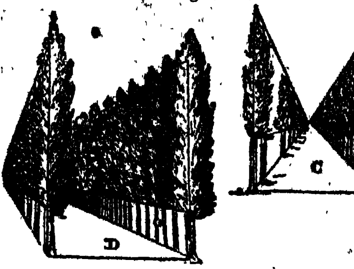
To find the perspective of a given point in space (fig. 8). This point being determined by the horizontal projection of a part, we can directly find the perspective of this projection. Let P be this point. From any point A draw the perpendicular A B equal to the height below its projection, and draw the lines A C, B C; C being a point taken at pleasure on the horizontal line O D; through the point P′ draw the horizontal line P′ H′; through the point H′ draw H H′ perpendicular, and H P″ horizontal; the perspective sought, P″, will be the point of meeting of the lines P P and H P″.

Fig. 8.



It will be easy to find by the aid of the problems now given the perspective of any object whatsoever. The lines of construction and the projection should be effaced, so as to leave only the perspective (fig. 9). The inspection of the subjoined figures C D will suffice to enable any one to understand the solution of the problem without the need of giving explanations. It must not be forgotten that in all these constructions, the eye is in front of the picture, and the object behind.

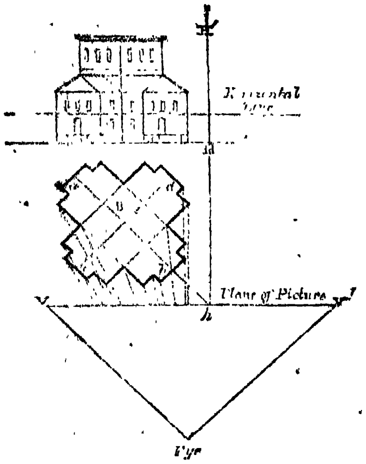
Fig. 9.



Distances between the eye and the object are, of course, arbitrary, as has been already remarked. It must, however, be noticed that the angle of distinct vision is between about 50° and 80°. This condition limits the nearest of the objects which can be represented; if they are too far off, the details escape the eye.

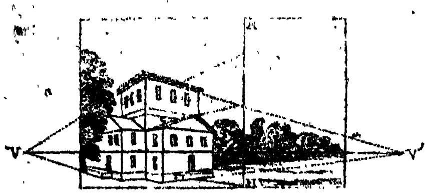
That the reader may have a general notion of the common mode of proceeding in the perspective representation of buildings we give the following diagrams :—

Fig. 10.



B is the plan of a building to be thrown into perspective, inclined to the plane of the picture at any angle, *v h a*. The vanishing points of all lines parallel to *a b* are found by a line from the eye parallel to *a b*, cutting the picture in V. Similarly, V is found to be the vanishing point of all lines parallel to *c d*. If *a b* be continued to *h*, it gives the place of the line H H, whereon the heights of the different parts of the elevation A may be set according to their several altitudes. The place of the horizontal line is chosen so as to afford the most agreeable representation of the object, its height depending, of course, on that at which the eye would most probably be placed, or might be supposed to be. The visual rays to the eyes are shown by the dotted lines.

Fig. 11.



Having thus prepared the geometrical plan and elevation of the object, the plane of the picture is set out as in fig. 11, and the reader must observe that the whole extent of it, horizontally, must not take in an angle of more than sixty degrees, that being as great as the eye can take in without turning the head, though in internal views a greater extent is tolerated. It is to be observed that in this diagram the representation, for the sake of greater distinctness, is doubled in dimensions from the plan The place of H H' is transferred to the picture, and the height carried down from it to the vertical lines, whose places have been found by the visual rays above mentioned. The vanishing points, V and V', are transferred to the horizontal line V V', and the horizontal lines in the sides tend thereto. It is obvious that a similar process enables the draftsman to make internal representations, the principles whereon they are conducted being precisely the same. It is needless to expatiate on the importance of perspective to the painter; and though Fresnoy has advised that "the compasses should be rather in his eyes than in his hands," it is clear that, without a knowledge of its laws, he can never hope to succeed.

Aerial perspective is the relative apparent recession of objects, from the fore-ground, owing to the quantity of air interposed between them and the spectator, and must accompany the recession of the perspective lines. The best and only guide to this branch of art is the careful and constant study of nature.

An excellent exercise, recommended to beginners, is to draw a landscape or a piece of ornament, using only three tints. The strongest, which must be placed first, determines the shades; the second must be weaker, that denominated half-tint serves to bring out the lights and the shades; and the third, the weakest, will show the colouring of the objects in the light. There is no drawing which cannot be executed; no effect which cannot be produced, by means of these three tints.

Parallel perspective (fig. 12 *a*) is where the picture is supposed to be so situated as to be parallel to the side of the principal object in the picture; as a building, for instance. *Oblique perspective* (fig. 12 *b*) is where the plane of the picture is supposed to stand oblique to the sides of the object represented; in which case the representations of the lines upon those sides will not be parallel amongst themselves, but will tend towards their vanishing point. Oblique perspective is generally much to be preferred when attainable, for any view, it being essentially more picturesque, as may be seen by referring to the accompanying diagram.

Fig. 12 *b*.

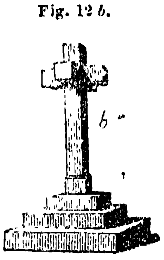
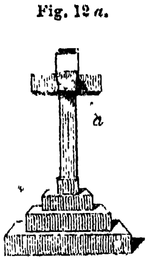


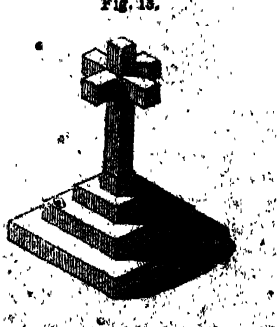
Fig. 12 *a*.



Isometrical perspective yet (fig. 13) remains to be noticed. It is founded on the *orthographic* projection of the sphere, in which the eye is supposed to be at an infinite distance; so called because the perpendiculars from any point of the sphere will all fall in the common intersection of the sphere with the plane of the projection; or it may be defined to be that projection which is made by drawing lines from every point, to be projected perpendicular to the plane of projection. Orthographic projections of the sphere are usually made either on the plane of the equator, or on the plane of a meridian. The plans and sections by which artificers execute their work are orthographic projections of the things to be constructed.

On these principles, isometrical perspective was invented by Professor Farish, of Cambridge, by which solids, of the form of rectangular parallelopipeds, or such as are reducible to this form, can be represented with their three pair of planes in one figure, which gives a more intelligible idea of their form than can be done by a separate plan and elevation. At the same time, this method admits of their dimensions being measured by a scale as directly as by the usual mode of delineation. As applied to marking, it gives the elevation and ground plan in one view. It is considered, for such purposes, to be preferable to the methods in common use, as it is easier and simpler in its application.

Fig. 13.



[illegible] and it might be the attacks of the mightiest nation on the globe. He tried for a long time in vain to conciliate the senate, and secure their recognition of his government.

The election of Julius Cæsar to the consulship at last opened a path for the accomplishment of the design he had in view. Cæsar was deeply in debt, and finding that Ptolemy was disposed to purchase the influence which his office gave him, a bargain was at once struck. He received an immense sum of money, and in return was successful in having the Egyptian king publicly proclaimed the friend and ally of the Roman people. The favour was, however, dearly bought. The sum which he promised amounted to sixty thousand talents, or nearly £900,000 sterling, and in order to raise it, he was obliged to tax the people so heavily that they rose in rebellion and expelled him from the kingdom. Into the intrigues, and plots, and bribery, and corruption, which he employed to procure his restoration, want of space will not permit us to enter. It will suffice to say that by a series of efforts unparalleled in the annals of fraud and villany, he was reinstated by the senate, and died in the peaceable possession of his kingdom. He left two sons and two daughters, and to the eldest son and daughter he bequeathed the crown, directing that, according to a practice by no means uncommon in Egypt, they should marry together, and should reign jointly. The daughter was at this time but seventeen, and she was the elder of the two, and on account of their youth he left them under the guardianship of the Roman senate. The queen was the celebrated and unfortunate Cleopatra, whose life is one of those strange and thrilling romances which lie scattered here and there through the pages of history, startling, but not always impressing us by the terrible vividness with which they paint the vanity of human greatness, and the certainty of the retribution which awaits all wickedness, no matter what may be the rank of the criminal, or how alluring the refinement of the vice.

No sooner had Cleopatra ascended the throne than her husband and brother began to intrigue with some of his ministers to deprive her of her rights. They were so far successful that she was obliged to fly from the palace and take refuge in Syria. She soon collected an army, and was preparing to assert her claims by force of arms, when a message from Cæsar put a stop to the preparations on both sides. This great commander had a short time previously defeated his rival Pompey at the famous battle of Pharsalia, and now sailed in pursuit of him to Egypt. Upon his arrival, he ordered Cleopatra and Ptolemy her brother, to submit their claims to his arbitration. Each party immediately appointed representatives to plead its cause before the consul. Ptolemy's army was encamped before Pelusium, and Cleopatra was preparing to return from Syria, but before setting out she formed a resolution which places her character and talents in a striking light, and decided her fate. She wisely perceived that her presence must avail more with the Roman general than the most powerful pleading of the most eloquent advocate. She was now twenty years of age, and in possession of all the charms of figure and face which can inspire love and admiration, and all the graces of manner which strengthen and retain them. She had all the voluptuous warmth of expression and features which are said to be peculiar to the East, and which invariably surprise and overpower men from the colder climates of the north. Her voice, historians tell us, surpassed the lyre in sweetness and cadence, and she displayed the exquisiteness of her tone and her skill in its management, not in her own language merely, for she was mistress of several. She was familiar with the literature and philosophy of the day, and could converse with fascinating ease and brilliancy upon all topics, whether grave or gay, lively or severe, passing without difficulty from the beauties of art to the mysteries of science or the intricacies of politics, but ever recurring with a partiality which may be readily excused, to the trifling but persuasive blandishments of love. She seemed made to charm men's eyes and to subdue their hearts. Never were Beauty and Valour so well represented as in the interview between the queen and the consul.

That interview was strangely brought about. Cleopatra, with but one attendant, caused herself to be rowed in a small boat in the darkness of the night under the walls of the citadel of Alexandria. But here a difficulty presented itself. How was she to gain admittance at so unseasonable an hour? She bethought of a stratagem which answered her purpose. Laying herself at length in a bundle of clothes, Apollodorus, her attendant, tied her up in them, and carried her through the gate and into Cæsar's private apartment as a parcel. Loosening the tie, Cleopatra arose and stood before him. The iron soldier, who tramped unmoved through the fierce excitement of a hundred stubborn battles, was "quite vanquished." The light of her eye struck deeper than even the dagger of Brutus, and he yielded himself captive. We are not told whether they on that night deliberated on the state of the nations, or sought to reconcile by deep laid plans and strokes of state policy the conflicting claims of the two great parties who divided the kingdom between them. But we neither outrage probability nor turn aside from historical accuracy if we assume that Cæsar forgot all graver cares and deeper thoughts in the fascinating society of the queen. She had a son named Cæsarion, after his father.

The next day Cæsar summoned a meeting of the citizens and the king, and proposed to them to place things in the same position as before the quarrel, by leaving Cleopatra and her brother on the throne. Although Ptolemy's adherents gave an apparent assent to this proposal, they feared that they had gone too far against the queen ever to hope for forgiveness, and that, if she were once restored to power, she would inflict upon them condign punishment. No sooner, therefore, had the assembly broken up, than hostilities were resumed, and Ptolemy was for a long time infatuated enough to hope that he would be able finally to expel the Romans from the country. But he paid for his presumption with his life. The conqueror of Pharsalia was not to be baffled at the head of his victorious legions by an army of slaves, led on by eunuchs and a boy. The Egyptians were defeated in a great number of battles, and at last the unfortunate Ptolemy, flying from a severe defeat, was drowned while attempting, in terror and confusion, to cross a rapid river. He was in the eighteenth year of his age, and had reigned for three years and eight months. Under better guidance he might have been a wise monarch, and enjoyed a longer and more prosperous reign.

Cæsar now placed Cleopatra on the throne, and associated with her in the government her youngest brother, a child of eleven years, and placed three Roman legions at her disposal. Now that all was peace and tranquillity, there was nothing further to detain Cæsar in Egypt, but he was unable to leave Cleopatra, and during the ensuing nine months remained constantly in her society. The court during this period was a scene of unheard-of gaiety, frivolity, and extravagance. Whole nights were passed in feasting, dancing, and music. At last he tore himself away to enter upon a career of conquest in Asia, and saw her no more. Upon his return to Rome he was assassinated.

During an interval of nearly six years Cleopatra reigned undisturbed. When her brother came of age she poisoned him, and took the government into her own hands. When the battle of Philippi had thrown the empire of the world into the hands of the triumvirate, she was summoned by Antony to give an account of her conduct, and it was generally understood that he intended to find some excuse for subjecting her kingdom to tribute. She determined to subdue him with the same weapons which had vanquished a mightier than he. She was still in the bloom of her beauty, and now added the art of womanhood to the charms of youth. She went to meet him on the river Cydnus in a style of gorgeous magnificence.

"The barge she sat in, like a burnished throne
Burned on the water, the poop was beaten gold.
Purple the sails, and so perfumed that
The winds were lovesick with them, the oars were silver;
Which to the tune of flutes kept stroke, and made
The waters which they beat, to follow faster,
As amorous of their strokes. For her own person
It beggared all description; she did lie
In her pavilion (cloth of gold, of tissue),
O'er picturing that Venus, where we see

The fancy outwork nature; on each side her
Stood pretty dimpled boys, like smiling cupids,
With divers-coloured fans, whose wind did seem
To glow the delicate cheeks which they did cool,
And what they undid, did."

Antony fell into her toils, forgot his present interests and his past glory, and surrendered himself a prey to all the enervating influences of eastern effeminacy. Softly languishing in the arms of love, he suffered the affections of the soldiery, and all the other advantages which he had acquired by a life of toil and danger, to pass from him. The machinations of his rivals (for Octavius already aspired to the supreme power) were suffered to go on unchecked, and he only awoke from his inglorious ease to find himself gliding to ruin. The battle of Actium decided the fall of the empire, and left him at the mercy of the conqueror. A few more vain attempts and he found himself deserted and betrayed by all. Cleopatra had shut herself up with her treasure in a strong tower, which appears to have been intended for a royal sepulchre, and caused a report to be spread that she had put herself to death. It came to the ears of Antony. No less unhappy in his love than his ambition, he resolved to follow her example, and called upon his freedman to run him through the body. The faithful follower, to avoid the dreadful task, turned his weapon against himself, and inflicted a mortal wound. Antony snatched the sword from the wound, and plunged it into his own breast. While weltering in his blood, and writhing in the agonies of death, the news was brought him that Cleopatra still lived. He faltered out a request that he might be carried into her tower, that he might gaze once more upon the matchless form of the syren who had lured him to his doom. The last interview between the unhappy lovers is said to have been affecting in the extreme. Cleopatra wept and tore her hair in the anguish of despair, avowing her intention to follow him speedily to the Elysian fields; and Antony's dying moments seemed soothed by the consciousness that whatever doubts he might previously have had of her faithfulness, in his last and worst peril she still loved him.

Soon after this she had an interview with Octavius, whom she received in the midst of the pomp and splendour of decoration which she knew so well how to assume. The meeting was short and cold, but she learned from it that it was his intention to take her to Rome, to form part of his triumphal procession. This was an indignity which her proud spirit could never brook. Finding that her charms found no favour in the eyes of the cold and politic general, she lost hope and resolved to die. Applying an asp to her breast, the subtle poison of the serpent was soon diffused through her veins, and she died as she had lived, vain, fickle, ambitious, and deceitful. The guards who were sent to seize her found her on a golden couch, dressed in royal robes, and one of her female slaves dead and the other dying at her feet. She was buried with great pomp in the tomb with Antony. They had lived together in infatuation, and it was but fitting that in death they should not be divided.

Cleopatra's abilities were, after all, purely feminine. She had all the vices and follies of a woman, without any of the talents of a great ruler. Her political ends were accomplished by perfidy and cruelty. Those who loved her she ruined. Cæsar escaped from her toils by a strong effort; but Antony, less resolute, less energetic, and more wavering, drank the cup of folly to the dregs, and paid the forfeit of disappointed hopes and an untimely end. The whole story is full of instruction, and to us, in these more blessed days, it conveys a striking picture of the fearful moral darkness of the ancient world, ere the Sun of Righteousness had arisen with healing in his wings.

Claude Lorraine, the prince of landscape painters, to whom sun and sky, wood and water, calm and tempest, were alike all glorious and all beautiful, has lent the aid of his magic pencil to commemorate one of the greatest triumphs of the Egyptian queen, when, in the zenith of her pomp, and pride, and beauty, she went forth to conquer another of the Romans. The moment chosen is that of her leaving the gorgeous galley in which she had descended the Cydnus to meet the triumvir in the market-place.

DISEMBARKMENT OF CLEOPATRA, AFTER CLAUDE LORRAINE.

KIRKSTALL ABBEY (YORKSHIRE.)

KIRKSTALL ABBEY, FROM A PAINTING BY TURNER.

KIRKSTALL ABBEY belonged to the order of Benedictine monks, and was founded in 1147 by Henry de Lacy, a Norman knight, on the banks of the Aire, in one of those picturesque situations which are so numerous in the wild and diversified scenery of Yorkshire. The "Fathers" seem to have had a keen eye for the beautiful, as well as a keen appreciation of creature comforts, for if report speaks truly, they knew the flavour of good wine, and could pronounce upon the merits of a cook as men having authority in such matters. But, eschewing all scandal and gossip, we think those old friars have, with all their faults, deserved well of their country in having kept alive the love of art, and having bequeathed to later generations legacies so rich in beauty and so full of historic reminiscences as the thousand hoary ruins that are scattered over the length and breadth of the United Kingdom. Light may the turf rest upon their bones! They did well, when wearied with the "toils and fardels" of life, to choose a spot blessed in sun and soil and station, in which to end their quiet lives in peace and obscurity. Can we blame them, if when disgusted with the hideous moral aspect of the dark ages they turned more fondly to nature, ever beautiful and ever new, and took care that nought around their peaceful abode should remind them by its harshness or deformity of the crimes and follies of the great world without? Be this as it may, this much is certain, that seldom is an abbey found where the eye of an artist would not love to dwell upon the surrounding scenery. It is needless to cite instances in support of our position. Many of our readers have doubtless gazed in rapture upon the ruined walls of "fair Melrose," and doubtless some by moonlight; fewer perhaps (but let us hope the number is increasing) have wandered through the Seven Churches in the secluded valley of Glendalough;—

"By the lake whose gloomy shore,
Skylark never warbles o'er;"

and others may perhaps have penetrated to the shady beauties of "sweet Innisfallen," which no visitor ever left without heartily echoing the sentiment of the departed poet—

"How fair thou art let others tell,
To *feel* how fair shall long be mine!"

These abbeys too have still another claim upon our interest. Throughout the British islands they were for many a year the only refuge of the conquered and oppressed race. Once within the convent gate, the cowl and the monastic vows removed the stain of Saxon blood and stayed the violence of the Norman soldier. Oh, how many weary hearts, pining for loss of home and kindred, mourning over a brother's or a father's murder, or a sister's unrevenged insult, sought peace, which the world could not give, within those grey old walls!

What Nature had beautified, Religion took possession of, and sanctified and gathered into her quiet resting places the down-trodden and the conquered. The form in which the holiest and highest aspirations of our nature manifested themselves in those dark and troublous days were doubtless wanting in truth and light, but they were not on that account less beneficial, and we must all confess were wonderfully adapted to the wants of the times.

When the need of these asylums was gone, in England at least they fell and perished. Henry VIII swept them all away, and Kirkstall Abbey amongst the rest, but there is enough of architectural beauty and historic interest still lingering around every one of them to well repay a visit.

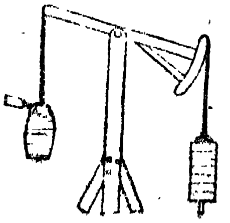
Our engraving is taken from one of Turner's best paintings. Of the artist or his style we shall here say nothing, as we hope shortly to present our readers with a portrait of him; and a memoir is in preparation which will embrace all that can be said of his career and excellence in his profession.

HYDRODYNAMICS;

OR, THE APPLICATION OF WATER AS A PRIME MOVER OF MACHINES.

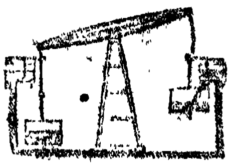
The term *Hydrodynamics* has been used by many good authors as synonymous with the term *hydraulics*. There is, however, a very considerable difference between them; and it is advisable, in the present advanced state of science, to render that difference subservient to the useful purpose of classification. The term *hydraulics*, in its original and strict meaning, signifies the theory and practice of the *motion of water through pipes;* and is generally applied to the art of raising water by mechanical means. The term *hydrodynamics*, on the other hand, strictly signifies *water-power*, and is generally and properly applied to the theory and practice of the *motion of water when used as a prime mover of machinery*. With the use of the latter term in its proper meaning and application the ancients appear to have been unacquainted, and, in fact, the science itself is almost entirely of modern origin. The machines in which water is employed as a prime mover, may be divided into two great classes: *first*, those in which the water acts only by its weight in producing an alternate vertical motion, or a continued rotary motion; and *second*, those in which the water acts both by its weight and its impulse, or produces a continued rotary motion in a wheel.

Fig 1.



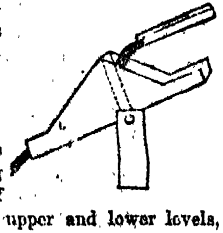
In the first class of machines are included those in which *water is balanced on a working beam* by a weight to be raised, or a mass of any kind to be put in motion. Thus, in fig. 1, a bucket is made to descend by the weight of water it contains, and to ascend by a counter-weight when emptied. The length of the descent, and, of course, the height to which a given weight may be raised, will correspond to the height of the reservoir which supplies the bucket with water above the level to which it descends and is emptied of its contents. The counter-weight may be attached to a pump-rod, and the force employed to raise the pump will then replace the weight to be raised by the weight of the water in the bucket. A machine similar to this was contrived by Mr. Sergeant, of Whitehaven, in 1801, and was erected at Irton Hall.

Fig. 2.



Again, fig. 2 represents a similar apparatus, with double action. In this machine, while one vessel is emptying itself another is being filled, so that both the ascent and descent of the buckets are rendered available for the production of motion. The alternate motion of the working beam, in this apparatus, may be employed directly in the working of pumps for the raising of water to an elevated level, or in the production of a prime mover for the operations of a manufactory, a mill, &c.

Fig 3.

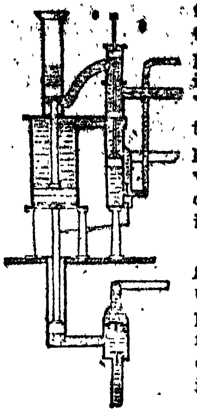


The simplest form of apparatus of the preceding description is represented in fig. 3, where the water falls alternately into one of two compartments into which the moveable reservoir or bucket is divided.

The apparatus exhibited in figs. 1 and 2, may be transformed into more convenient machines by lengthening the sides of the bucket to the height of the fall, or the difference between the upper and lower levels, rendering them fixed, and the bottom moveable, so as to move up and down in the interior like a piston in a cylinder. Machines of this description are not well adapted for low falls of water.

The construction of *water-pressure engines*, in which water presses on a piston instead of steam, and produces alternate vertical motion, is similar in principle to the preceding machines. The single water-pressure engine is represented in fig. 4,

Fig. 4.

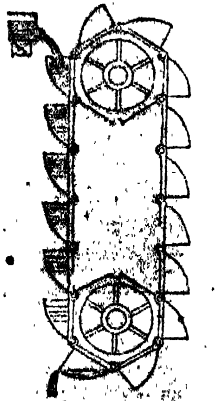


where a piston works in a cylinder, and by the action of a subsidiary piston, its interior face is alternately subjected to the pressure of a column of water contained in a tube and relieved from that pressure. When the large piston has reached the top of its course, it is restored to its primitive position by a counter weight; whilst the water which filled the cylinder, or put the piston in motion, escapes freely into the lower reservoir.

The construction of the double *water-pressure engine* renders the counter weight unnecessary. The action of the subsidiary pistons put alternately the upper and lower faces of the large piston in communication with the column of water which is connected with the upper reservoir.

By placing the cylinder vertically in this machine — a plan adopted for facility of construction — there is a loss on the height of the fall equivalent to the length of the cylinder. But such machines are only employed in cases where the fall of the water is very considerable, and where this loss is, consequently, of small importance. The first idea of the water-pressure engine appears to be due to Belidor, who proposed it in 1739. About ten years afterwards it was first put in operation in the mines of Schemnitz, in Hungary. After a period of other thirty years, Reichenbach, a celebrated engineer, erected and employed eleven engines of this description in the raising of water from the salt-mines of Bavaria, in the Tyrolese Alps. One of them, that of Illsang, raised the water at a single jet to the height of 1,108 feet. In 1831, M. Juncker, a French engineer and director of the mines of Poullaouen and Huelgoat, in Brittany, executed, on the same principle, the largest and the finest hydraulic machine in France. For the details and the description of this machine, the reader is referred to the author's own account, in the *Annales des Mines*, tom. viii., 1835.

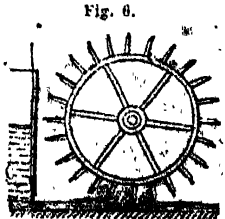
Fig. 5.



The machine called *Noria*, described under the head of *hydraulics*, being inverted as to the operation of the water, will become a hydrodynamical machine, as represented in fig. 5, where an endless chain, furnished with buckets, revolves on two drums placed vertically above each other, and communicates motion from either for any required purpose. The loss of power arising from friction and the rigidity of the chain is too great to admit of the useful application of this kind of machine, except in very peculiar situations.

The *inclined noria*, furnished with float-boards, and moving in a close mill-course, has also been proposed as a means of obtaining the application of water-power; but this arrangement has all the inconveniences of the preceding machine, without increasing any of its advantages.

Fig. 6.

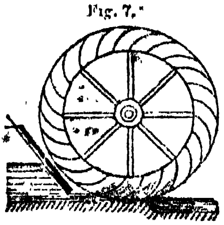


In the second class of machines, consisting chiefly of water-wheels, there are several varieties, which we proceed to describe in order. The simplest, and, probably, the most ancient species of water-mill, is that of the *undershot wheel*, represented in fig. 6, which acts by the impulse of the water on the under float-boards or vanes, and moves in a mill-course more or less contracted, according to the height of the fall and the quantity of water which is employed.

Experience has shewn that, in order to produce the best working effect, the velocity of the float-boards of an undershot water-wheel should be only about four-tenths of the velocity of the stream, and that even then the useful effect is only about one-third of that which is due to the height of the fall. The float-boards must also be confined in a mill-course which exactly fits them, and of a depth sufficient to prevent the stream of water from passing under them without producing the greatest possible effect.

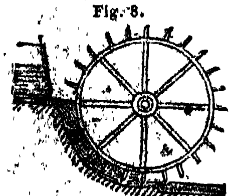
The facility with which an undershot wheel can be constructed on a low fall of water, and the small expense required for construction and repair, have induced some engineers of modern times to endeavour to improve this species of machine. Accordingly, M. Poncelet, in 1825, presented to the Institute of France a memoir concerning an improvement in the construction of undershot wheels, which nearly doubles their useful effect. This machine, which is represented in fig. 7, is composed of a wheel with circular float-boards, and a shrouding, like that of overshot wheels, to prevent the escape of the water by their sides. The reservoir or trough which contains the head of water, and the channel or mill-course, are also constructed so that the vein or stream of water which issues from the aperture in the sluice shall strike the float-boards as near as possible to the place of the *vena contracta*, or point where the contraction of the jet takes place. This species of wheel is particularly useful in low falls of about five feet and under. The form of the curve, adapted to any particular fall and size of wheel, is easily determined by drawing a perpendicular from the surface of the water in the mill-course at the point where it is to meet the outer circumference of the wheel, and from the point where this perpendicular meets the inner circumference of the ring of shrouding, describing an arc of a circle between both circumferences, with radius equal to its distance from the surface of the water, this will give the form and direction of the curve for each float-board round the wheel.

Fig. 7.



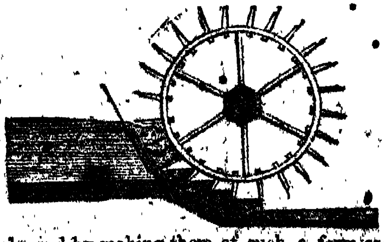
The next species of water-wheels are those called *breast-wheels*, in which the water is discharged at or nearly opposite the extremity of their horizontal diameters; and the mill-course is constructed in the circular form adapted to the size of the quadrant or arc of the wheel, which moves in it by joint effect of the impulse and the weight of the water on the float-boards. In the construction of breast-wheels, the water is allowed as little play as possible, so that its weight may have its due effect in that part of the fall which is abstracted from the whole height, in order to form the circular mill-course. Experiment has proved that the useful effect of such machines varies from four-tenths to five-ninths of that due to the whole height of the fall, and that it increases in proportion as the discharge of the water is taken nearer the level of the reservoir. Fig. 8 represents the breast-wheel, where the water is discharged from an aperture in the sluice exactly opposite the horizontal diameter of the wheel.

Fig. 8.



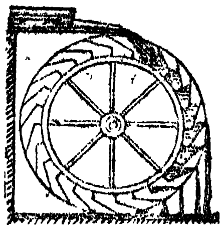
In cases where the *breast-wheel* receives the discharge of water on its float-boards over the top of the sluice instead of under it, as represented in fig. 9, it is said to possess very considerable advantages. These will, of course, be rendered more manifest by the application of shrouding to the float-boards, and by making them of such a form as to retain the water as long as possible before they reach the vertical position; or by making the circular mill-course of such a form that little or no water can escape at their sides, if they are constructed without shrouding. The useful effect of such machines is experimentally found to vary from three-fifths to three-fourths of that due to the height of the fall. They may be made to act with very different velocities without producing a useful effect differing sensibly from the maximum. They are chiefly advantageous for falls varying in height from 5 feet to 6 feet; for larger falls they are too heavy, because their radius must be at least equal to the height of the fall.

Fig. 9.



The most common and most valuable species of water-wheel is that denominated the *overshot wheel*, which in its simplest form is but the Persian wheel inverted; that is, having the water discharged into its buckets at the top, instead of being loaded with it at the bottom. By this means, the water acts by its weight during nearly the whole height or descent of the fall. In the ordinary construction of overshot wheels, the buckets are made of the form represented in fig. 10; being a series of float-boards bent at one-third of their radial distance between the inner and outer circumferences of the shrouding, at an angle varying from 110 deg. to 118 deg., according as the wheels vary from 13 feet to 40 feet in diameter. The shrouding, which consists of three rings of wood or metal, two flat, one being placed on each side of the series of float-boards, and one circular behind them, thus forming them into actual buckets, may be dispensed with, if there be abundance of water and a low fall; provided also the mill-course be circular and as contracted as possible. When there is little water and a high fall, then the use of buckets becomes indispensable. The useful effect of these machines may be generally estimated at four-fifths of that due to the head of water.

Fig. 10.



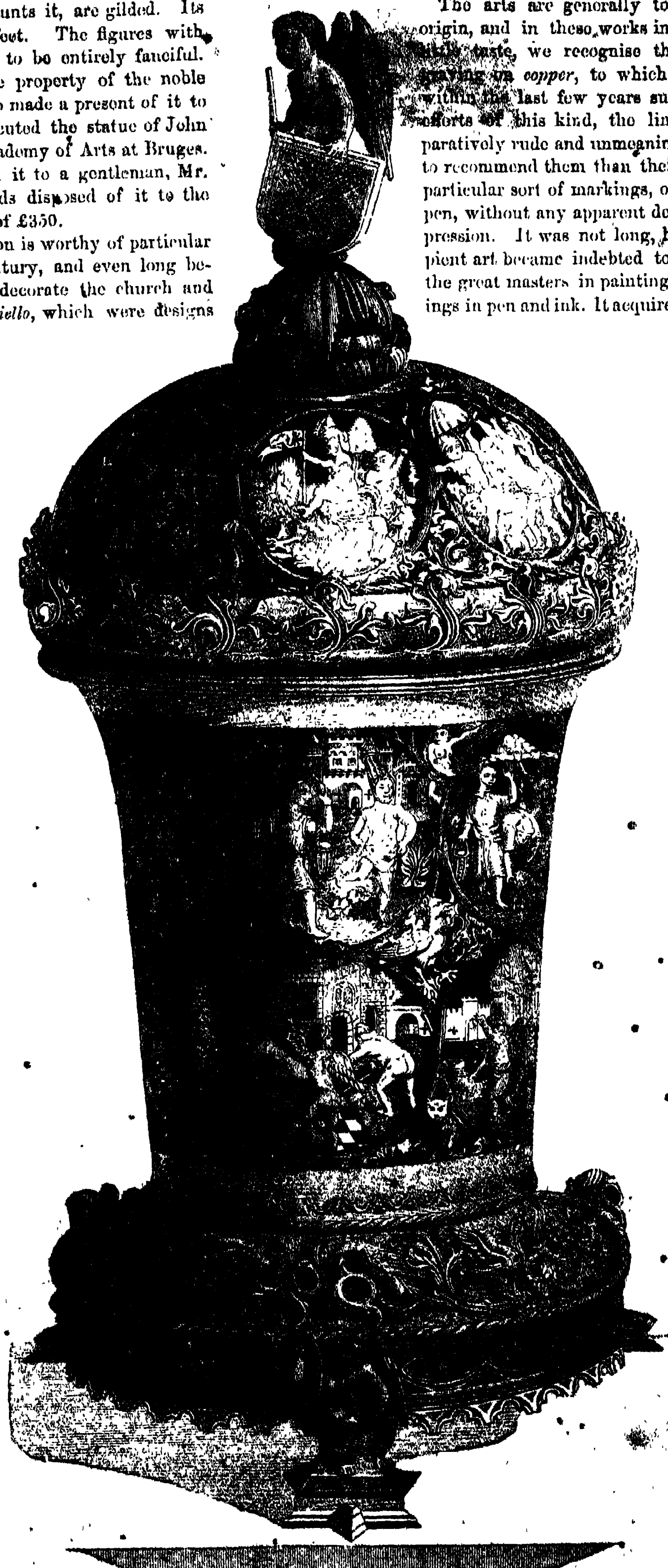
Besides friction, it is evident that there is a considerable loss of water from the buckets after they reach the position of the horizontal diameter of the wheel; and these causes alone will sufficiently account for the loss of one-fifth of the useful effect of the moving power. According to this estimate, it will be found that a reservoir which discharges 1,200 cubic feet of water per minute, on an overshot water-wheel, with a fall of 30 feet, produces a useful effect equivalent to that of a Boulton and Watt steam-engine of 54 horse-power. Of course, the useful effect of any other overshot water-wheel, where the discharge per minute and the height of the fall are given, may be calculated from this result by the rule of compound proportion.

Models of two overshot water-wheels, each of 140 horse-power, 40 feet in diameter, and 12 feet in breast, were exhibited in the Crystal Palace, by the Devonshire Great Consolidated Company; and are now deposited in the Museum of Practical Geology. These wheels pump the water from the mines of the company near Tavistock in the county of Devon, and are supplied by water brought from the river Tamar at the distance of two miles. The one works a set of pumps which discharges 60 gallons of water per stroke from a depth of 600 feet, and the other 98 gallons per stroke from a depth of 360 feet.

Horizontal water-wheels, with vertical axes, have also been employed as a means of transmitting water-power to machinery for useful purposes, especially on very limited falls; but they have been found generally to produce a useful effect which was only one-third of that due to the moving power. To machines of this description, differing from each other very considerably in the details of their construction, the French have given the general name of *Turbine*; but they are all constructed with a vertical axis, and float-boards, sometimes plane, but usually curved, which are put in motion by the action of a fluid vein or stream, which enters into their interior, and is discharged at their exterior circumference, or conversely. The useful effect of turbines was raised by M. Burdin, from one-third to about three-fourths of that due to the moving power, by adopting a construction proposed by M. Borda, and represented in fig. 11, in vertical and horizontal section.

(*Continued on page* 208.)

CURIOUS CUP IN NIELLO, PRESERVED IN THE BRITISH MUSEUM.



The remarkable cup, of which we give an engraving, is traced to the fifteenth century. Its substance is silver; the base, the upper border of this cup, the lower border of the lid, the flower, and the statuette which surmounts it, are gilded. Its total height is about three feet. The figures with which it is adorned, appear to be entirely fanciful. For a long time it was the property of the noble family of Van Bekelhout, who made a present of it to the sculptor Calonia, who executed the statue of John Von Eyck which is in the Academy of Arts at Bruges. The widow of this artist sold it to a gentleman, Mr. Henry Farrer, who afterwards disposed of it to the British Museum for the sum of £350.

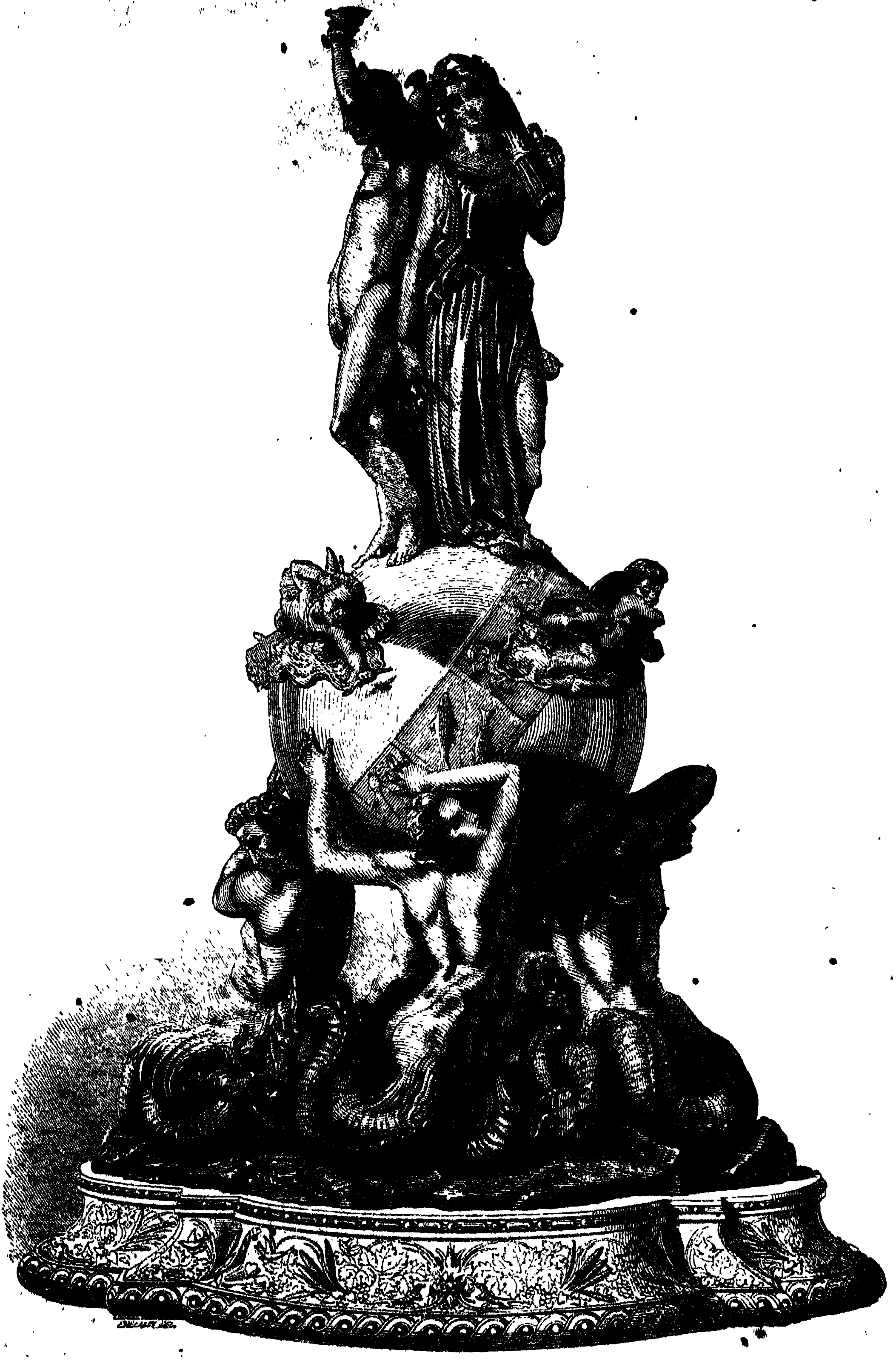
The manner of its execution is worthy of particular notice. In the fifteenth century, and even long before, it was the practice to decorate the church and other plate with works *in niello*, which were designs hatched with a steel point in gold or silver, then engraved with the burin, and run in while hot, with a composition called *niello*—an Italian term, derived from the Latin *nigellum*, from the compound of silver, lead, copper, sulphur, and borax, which was easily fusible, being of a black colour. The superfluous part of this niello which remained above the surface of the plate was then rubbed off with scrapers, and cleaned away with pumice-stone, leaving the engraved design on the plate, with all the effect of print.

Remarkable as this process was, there arose out of it another, incalculably more so. It became a practice for artists, who wished to preserve their designs, to take impressions of their plates with earth, over which liquid sulphur was poured, and from which, when cold, the earth was removed. But, Maso Finiguerra, a goldsmith and sculptor of Florence, and a pupil of the celebrated Masaccio, about the middle of the fifteenth century, carried the process still further, for with a mixture of soot and oil he filled the cavities of the engraving he had made, as a preparation for niello, and by pressing damp paper upon it with a roller, obtained impressions on the paper, having as Vasari says, "Veni vaffo come disignate di penna"—all the appearance of drawings done with a pen. Finiguerra was followed by Baccio Balderri, a goldsmith of Florence, who, according to Vasari, employed the eminent artist Sandro Botticelli, to design for him.

The arts are generally to be traced to a humble origin, and in these works in niello often discovering little taste, we recognise the cradle of that of engraving on *copper*, to which engraving on *steel* has within the last few years succeeded. In the earliest efforts of this kind, the lines produced were comparatively rude and unmeaning, and had nothing more to recommend them than their merely representing a particular sort of markings, or slight hatchings with a pen, without any apparent degree of execution or expression. It was not long, however, before this incipient art became indebted to the elegant etchings of the great masters in painting, as well as to their drawings in pen and ink. It acquired accuracy and taste from the drawings of Raffaelle, Michael Angelo, and Leonardo da Vinci, which connoisseurs of our own time have seen and admired. Some of those by Da Vinci were hatched in a square and delicate manner, with a white fluid on dark-coloured paper; while those of Michael Angelo and Raffaelle inclined more to the lozenge, in black or brown ink. They even carried this style of hatching with the pencil into their pictures, some of which adorn the Vatican, and into the famous cartoons, which are the glory of our own picture gallery at Hampton Court; and by the persevering application of the graver, the art has been advancing to the present period.

When compared with painting, it appears but of recent invention, being coeval only with the art of printing. Like it, it possesses the power of multiplying indefinitely, the productions of talent and genius, and in one respect its power is greater, for the *language* of engraving is universally known. It is for us to rejoice in the immense power that it now possesses, and to avoid the error pointed out by Lord Bacon when he said: "We are too prone to pass those ladders by which the arts are reared, and generally to reflect all the merit to the last new performer."

GROUP IN SCULPTURED SILVER.



This extraordinary work is a very successful imitation of some of those which appeared at the revival of art in the middle ages It was first exhibited at one of the Expositions at Paris, in 1849, and since, in 1850 and 1851, at the Palais Royal. On the first occasion it was not as much noticed as it has since been. The central jury appears to have fully appreciated its merits. Their report may furnish some idea of the labour and difficulty attendant on its execution. It has been made after models of M. Jean Feuchère and under his direction, in chased silver, to the absolute exclusion of casting or any other of the processes heretofore usually employed. The silver has been moulded like clay, or plaster, and the success of the attempt has been triumphant. No figures in high relief could be executed with greater boldness, and, at the same time, with greater chasteness. The whole group is composed of not less than forty separate pieces. Each of these was moulded separately, but of course from time to time compared and reduced into harmony and keeping with the others; and in this lay the great difficulty of the work. All the fingers are hollow, but each hand is composed of ten or twelve pieces. In labour requiring such delicacy and minuteness, of course a great deal in the chasing depends on a careful preparation of the metal by the goldsmith. The group is intended as an ornamental centre piece for a dinner-table. It represents the terrestrial globe girt round by the zodiacal band, and surmounted by figures of Ceres, Bacchus, and Venus. Ceres carries a sheaf of corn on her shoulder, and holds some heads of ripe poppies in her right hand. Bacchus carries the Thyrsus in his right hand, and a goblet in his left. Love is perched on the left shoulder of Venus, and her right hand is playing with the apple awarded her by Paris. Around the globe fly four little genii · one carries a lyre, another two torches, another the horn of plenty, and the fourth a bow and arrows. The earth is supported by four Titans, two male and two female torsos, each ending in the tail of a reptile. These rest on piles of rocks representing chaos, and personify the vices and disorders which reign in the world. The genii are figurative of the evils of war and the blessings of peace; and the three figures on the top symbolise the higher active principles of nature, pleasure, beauty, and utility.

The border of fruits and fields around the pedestal is executed with surprising delicacy, and would have done credit to Benvenuto Cellini.

SHADOWS.

Cowper, when describing his "Winter Morning Walk," and alluding to the sun, points out an effect which many of our readers have verified --

——————" His slanting ray
Slides ineffectual down the snowy vale,
And tinging all with his own rosy hue,
From every herb and many a spiry blade
Stretches a length of shadow o'er the field.
Mine, spindling into longitude immense,
In spite of gravity and sage remark,
That I myself am but a fleeting shade,
Provokes me to a smile. With eye askance
I view the muscular-proportioned limbs
Transformed to a lean shank. The shape less fair,
As they designed to mock me, at my side
Take step for step: and as I near approach
The cottage, walk along the plastered wall.
Preposterous sight! the legs without the man."

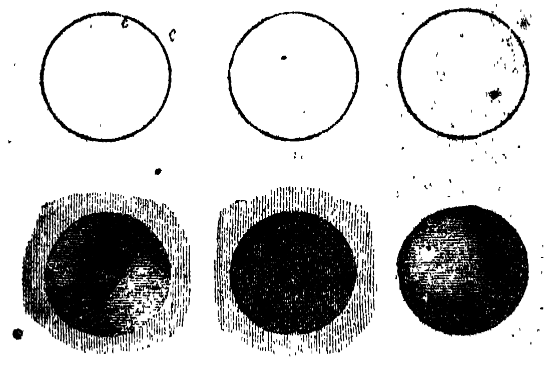
The present paper is intended to follow one on the "Elements of Design," and another on "Perspective," Shadows being regarded in connexion with them both.

To show forcibly to the reader the power of shading in giving *form* to objects, let us make three circles in a row (fig. 1), and underneath them, three others of the same size. The introduction of shadows will now produce a startling effect. The first of the lower row becomes, by a little shading, a *rounded concavity;* the second a *circular indentation*, with a flat bottom; the third a *round ball.* When these are compared with their outlines above, the power of shadow will not fail to be appreciated.

Shadows are formed by an opaque body placed in the direction of a luminous ray. It may be said that the rays of light which emanate from the sun are parallel to one another, the sun being so far distant that it is impossible to appreciate their actual convergence.

As to the artificial light of a lamp, the rays being very short, their convergence is very sensible. It follows from hence that the light of the sun changes very little the form of objects, whilst, on the contrary, artificial light sometimes produces strange forms.

Fig. 1.



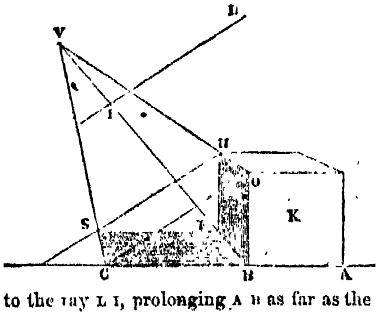
When the sun is in the horizon, the shadows are almost indefinitely extended. As it rises the shadows diminish in length, until, when it has reached 45°, the half of a right angle, the length of the shadows is equal to the light of the object which projects them.

Artificial light follows the same law as that just pointed out, with this difference—that the shadows increase as the light approaches the opaque body, and assume a conical form, the apex of the cone touching the luminous point.

After these explanations, the following rule is easily deduced. That the shadows of straight lines parallel to one another, and the perspective appearances of these shadows, meet in the same accidental points.

We will now give the solution of three most useful problems—when the light is in the plane of the picture, when it is behind it, and when it is in front of it.—

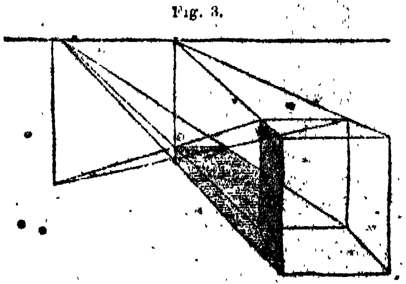
Fig. 2.



Suppose the sun in the plane of the picture (fig. 2): L I is the direction of one of its rays: to find the shadow produced by the opaque body K on a horizontal plane. The rays being parallel to one another through the points O H, draw geometrical parallels to the ray L I, prolonging A B as far as the intersection of the ray O C. From V draw the lines V C; V E, V H, B E. S C will be the shadow produced.

Then, when the sun is in the plane of the picture, the direction of the shadow of a vertical line on a horizontal ground is a line parallel to the horizon, and the ray passing through the extremity of this vertical line determines the length of the shadow.

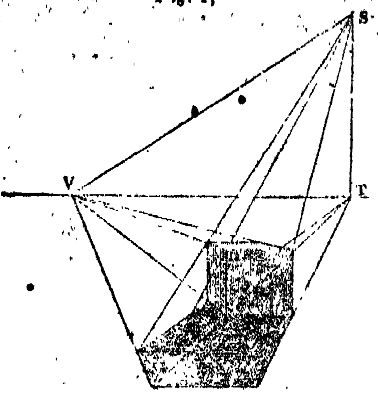
Fig. 3.



The sun being behind the picture (fig. 3), the direction of the shadow of a vertical line has, as its vanishing point, the foot of the perpendicular, let fall from the centre of the sun on the horizontal line; and the luminous ray issuing from the same centre, and passing through the extremity of the vertical line, determines the length of the shadow.

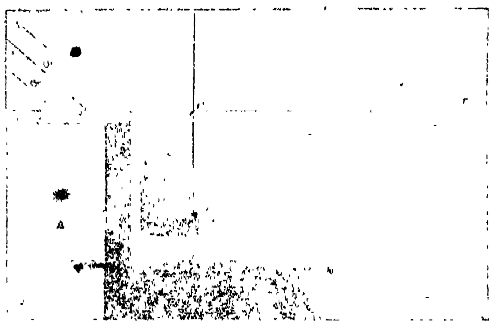
When the sun is behind the spectator, the operation is to be reversed (fig. 4).

Fig. 4.



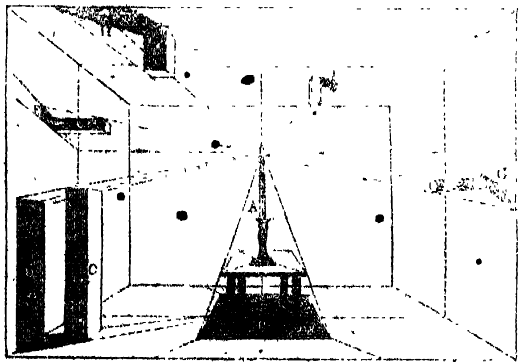
The form and direction of shadows produced by the sun may also be shown in the following way:—Find the angle of the sun's elevation, and draw parallels in that direction from all the points that determine the form of the dark side of the body. The process is illustrated by fig. 5. Let A and B be any two figures on which the light falls parallel to the plane of the perspective, and in the direction of the lines *s* and *s* draw the lines 1, 2, 3, and 4, parallel to the horizon, and meeting the lines s in 1 and 2, and the lines *s* in 3 and 4; join 1 2 and 3 4, and the four-sided spaces D and E are the shadows required.

Fig. 5.



When light falls at an angle, it is more difficult to determine the shadow. If it fall forward, it enlarges; if backward, it diminishes; but the vanishing point at which the light comes into the picture or goes out of it at the back may be found by setting off the tangents of the angles.

Fig. 6.



The general principle on which artificial light casts shadows may be found from fig. 6. A is the candle, B the shadow of the table, D and E the shadow on the floor and wall by the object C, F the shadow of an object projecting from the same wall, G the shadow of an object projecting from opposite wall, and H and I are shadows of objects projecting downwards from the roof or ceiling.

But while *direct* light comes from a luminous or shining body, whether natural or artificial, there is what is called *reflected* light, or that which first falls on the surface of some body which is not luminous, and is then thrown back from that on other bodies. Now, here some important differences are to be observed. As direct natural light proceeds in straight lines parallel to each other, and light from an artificial source proceeds in rays that diverge or spread, so the light which is reflected leaves the surface of the reflecting body at the same angle at which it falls upon it. Hence the principle, the *angle of reflection* is equal to the *angle of incidence.*

Accordingly, shadows produced by natural light fall all in the same direction; but when the light comes from a small point, such as the flame of a lamp or candle, the shadows fall all around it, while they are still on those sides of objects which are opposite to the light.

When the illuminating body is less than that which causes the shadow, the shadow increases in breadth as it is further from the body, and also as its body is nearer to the light. When the luminous body is larger, the shadow diminishes; and when the bodies are at very great distances from each other, the shadow continues for some space nearly of the same breadth.

The form of the shadow depends on the position of the surface whereon it falls, and also on that of the body which gives the light. If the surface on which the shadow falls be parallel to the body that throws the shadow, the shadow will be similar to that body. If the body stand perpendicular on level ground, the length of the shadow will be to the height of the object which throws it, as radius to the co-tangent of the elevation of the luminous body above the horizon; and if the ground on which the shadow falls be sloping, the shadow will be lengthened when the slope is downward from the object, and shortened when the slope is upward. The proportion may, therefore, be remembered by the following rule: the whole length of the shadow will be as the co-tangent of the angle which the light makes with the surface on which the shadow falls.

Another fact is also observable: no hesitation would ordinarily be felt in making the remark, "I see the sun shining on that house as clearly as possible," and yet it would not be correct. Not a single ray can be seen which passes from the sun to the house, and as no rays can be seen by the spectator but those which enter his eyes, it is the rays which are reflected by the house to him, and not those which proceed from the sun to the house that are actually visible. It may be asked, indeed, "Why, then, does one side of the house appear to be in sunshine and the other in the shade? For if I cannot see the sun's rays upon it, the whole of the house should appear in shadow."

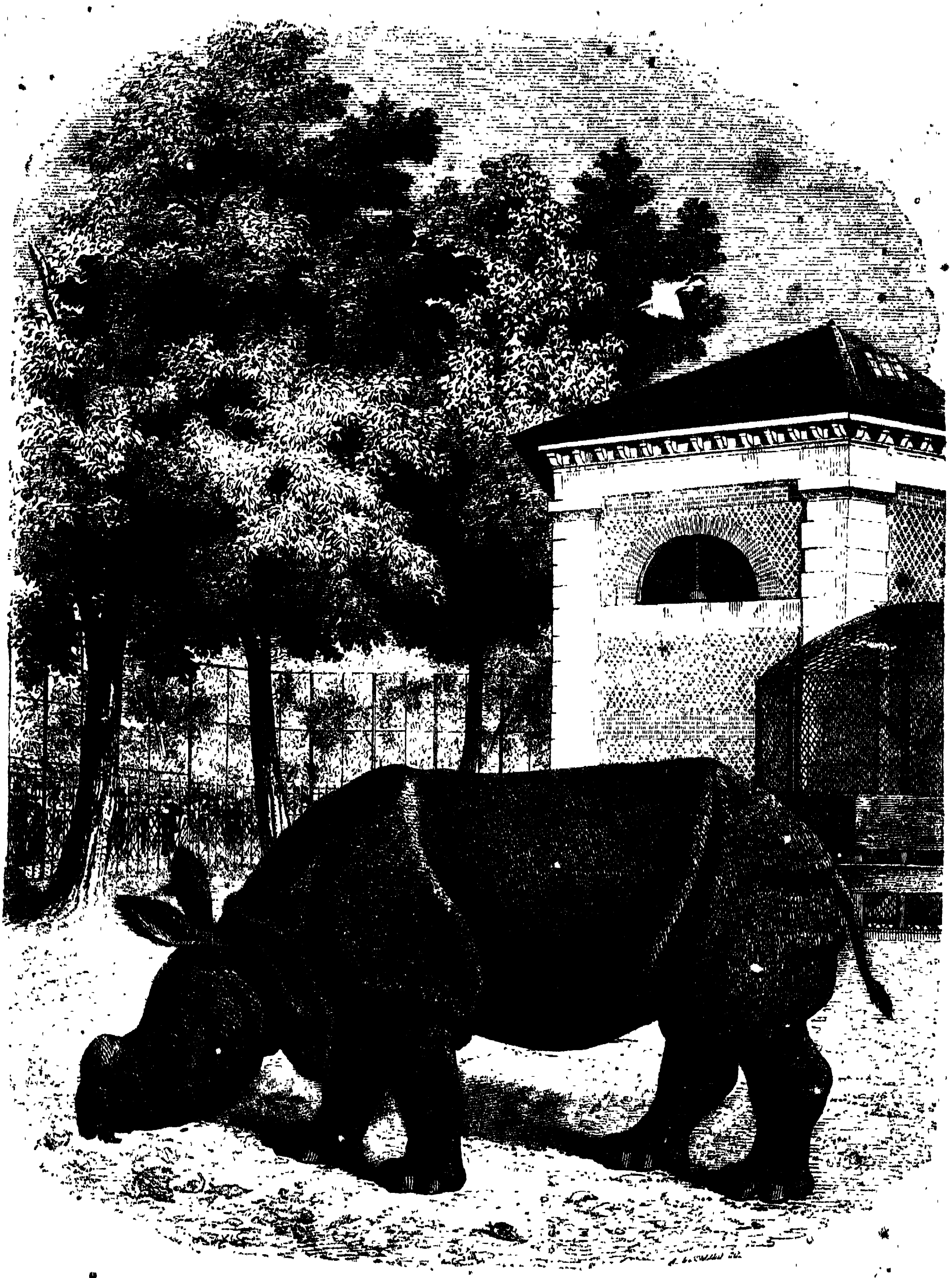
But the answer is easy. That side of the house on which the sun shines reflects more vivid and luminous rays than the side which is in shadow, for the latter is illuminated only by rays reflected upon it by other objects; these rays are, therefore, *twice reflected* before they reach the sight, and as light is more or less absorbed by the bodies it falls on, every time a ray is reflected its intensity is diminished.

There is still a kind of shadow of which we have not spoken, it is that which is styled by artists *accidental*. An accidental shadow in a picture is one the cause of which is invisible, as that of clouds when they fly over a landscape, or the shadow of a tree or a building when not included in the picture. This kind of shadow is of great value on many occasions, as giving distinctiveness and force to a picture which would otherwise look flat and tame.

IRON *VERSUS* GOLD.

Austria possesses at Eisenerz, in Styria, the most remarkable mine of iron in the world. The mountain in which it is situated has been worked for more than 1,000 years. It is 2,840 feet high, and nearly five miles in circumference at its base. It is literally a mountain of iron, the greater portion of the mass being ore of the richest quality. There is a tradition of very long standing amongst the miners to the following effect.—When the barbarians from the regions north of the Danube drove the Romans from Styria, the Genius of the Mountains, wishing to do the new inhabitants a favour, said to them: "Will you have Gold for *one* year, Silver for *twenty* years, or Iron for *ever?*" The wise ancestors of the Styrians, who had just begun to learn the true relative value of these metals, by finding that their rude swords were more than a match for all the wealth of the Romans, decided to accept the latter, and thus their descendants have iron of the finest quality to the present time.

THE RHINOCEROS.



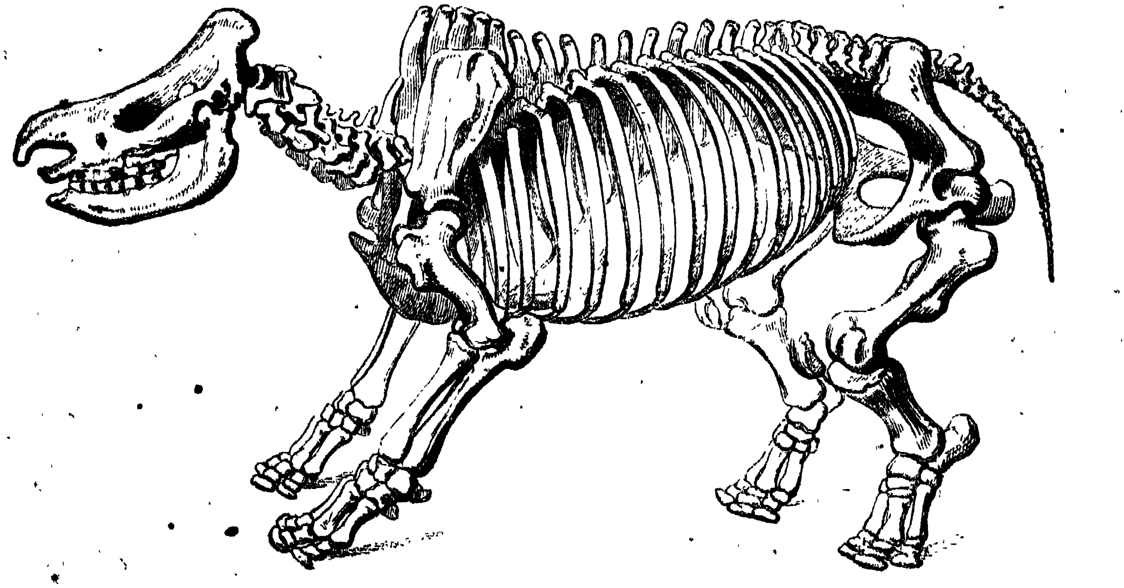
THE RHINOCEROS, AS SEEN IN THE ZOOLOGICAL GARDENS, REGENT'S-PARK.

UNTIL very recently the rhinoceros was an animal but rarely seen in Europe; and even now but few have more than a very vague knowledge of its habits and physiology. Of its general appearance our engraving may serve to convey a very good idea. The head is furnished with a horn growing from the snout, and sometimes three and a half feet long; the upper lip, which is long, ends in a point, and being very pliable, serves to collect the animal's food and convey it to its mouth. One of the most remarkable things in connexion with it, however, is the astonishing thickness and toughness of the skin, which hangs in heavy folds over some parts of the body, and possesses sufficient resistive power to blunt the edge of a sabre, or flatten a musket-ball.

Instead of the long ivory teeth which form the tusks of the elephant, the rhinoceros has, besides his horn, two strong incisive teeth in each jaw. These incisive teeth which the elephant has not, are placed at a great distance from each other in the jaws of the rhinoceros. The end of the tail is like that of the elephant, furnished with a tuft of large bristles very [illegible] and very solid. Huge and seemingly unwieldy as the rhinoceros is, he has the power of running with great swiftness, and possesses prodigious strength, so that though feeding on herbs, and of extremely peaceable disposition, he is, when roused, more than a match for any other animal.

But though the rhinoceros is thus formidable by nature, yet imagination has not failed to add to its terrors. Its scent it said to be most exquisite, and it is affirmed that it consorts with the tiger. It is reported also that when it has overturned a man or any other animal, it continues to lick the flesh quite from the bone with its tongue, which is extremely rough. Most of these foolish fancies have now, however, disappeared before the increasing light of scientific research.

The first rhinoceros ever seen in Europe was that of which Pliny speaks as having been presented by Pompey to the Roman people. According to Dion Cassius, Augustus caused another to be killed in the circus when celebrating his triumph over Cleopatra. Strabo states that he saw one at Alexandria, and has left a description of it. All these had but one horn. In the reign of Domitian two two-horned rhinoceroses were brought to Rome, and figures of them were engraved upon medals struck at the time. Some accounts have come down to us of the importation of some others under the Antonines, Heliogabalus, and Gordius III. But the invasions of the barbarians, and the troubles which preceded the downfal of the empire, prevented any further attention from being bestowed upon curiosities of this kind.



SKELETON OF THE RHINOCEROS.

Upon the revival of learning and the extension of maritime discovery, a lively desire was awakened all over Europe to see the productions and animals of foreign countries. About this time, therefore, a rhinoceros was secured in India and forwarded to Emmanuel, king of Portugal, in 1513, and was by him presented to the Pope. But on the voyage to Italy the ship was wrecked and all on board perished. A very imperfect sketch of the specimen was sent from Lisbon to the celebrated engraver, Albert Dürer, who engraved it; and strange to say, down to a very recent date this was the copy from which most of the representations of that animal in works on natural history were taken.

In 1685 a second was captured and brought to England. In 1739 and in 1741 two others were exhibited in various parts of Europe. In 1741 a very young one was placed in the menagerie at Versailles, and of this Buffon speaks in his *Supplements*. It died in 1793. In 1800 another young one was brought from India, intended for a menagerie at Vienna, but died at London on the way, and was dissected by Mr. Thomas, who published the results of his investigation in the "Philosophical Transactions." In 1818 another was exhibited in a strolling menagerie at Paris, and was closely examined by Cuvier. That was the last which was seen on the continent until very recently, although they have been in English collections for a considerable length of time.

Although the rhinoceros is now so rare in Europe, geological researches have placed it beyond doubt that it was at one time very common. Fossil remains of it have been found in the earth in a great number of places. They are in fact almost as numerous as those of the elephant, with which they are frequently mingled and have been found, not in the south of Europe only, but away towards the extreme north. The first of these remains of which we can discover any positive mention are those which were discovered at Canterbury in 1688 by some workmen engaged in sinking a well. It was at first supposed that they belonged to the hippopotamus, but Grew proved this view to be erroneous.

In 1751 a great quantity of bones was found some distance below the surface in the Hartz Mountains in Germany, which from their appearance were supposed to have belonged to the elephant. The celebrated anatomist, Michel, having gone down to examine them, took one of the teeth with him to Paris, and compared it with those of a rhinoceros which was then being exhibited in that city. He then proved in the most explicit manner by the same method which has since been so successful in extending our knowledge of lost species in the animal kingdom, that the remains were those of a rhinoceros.

Twenty years after this discovery, a more extraordinary one still was made in Siberia, which was destined to remove all doubt upon the subject. A fossil rhinoceros, quite perfect, even to its skin, was found in the month of December, 1771, on the banks of the Viluji, a river which runs into the Lena, in 44° of north latitude. The skin was covered with a thick coating of hair, thus showing its adaptation to a cold climate; as the only species with which we are at the present day acquainted is found in the tropical regions, and has the skin perfectly bare, it was thus clearly proved that a distinct species had in past ages inhabited the regions bordering on the poles, and had become extinct beyond the memory of man. It is greatly to be regretted that the skin of this individual was not preserved.

Since then, various remains have been discovered in various parts of Europe, of some of which Cuvier in his "Researches on Fossils" has given descriptions more or less minute.

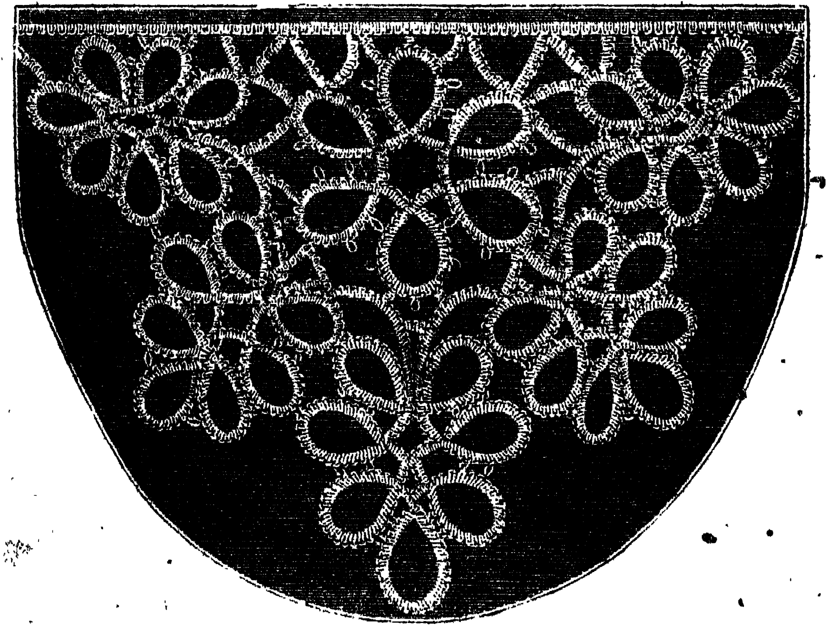
THE LADIES' DEPARTMENT.

TRIMMING FOR MANDARIN SLEEVES IN FRIVOLITE.

MATERIALS.—Tatting cotton No. 1; steel shuttle and a purling pin.

This trimming consists of scallops, of which the edge is formed by a series of clusters of leaves in tatting, with wheels of the same work in the centre of each. The leaves are formed of seven loops of tatting, and five of these go round each scallop. The wheel is connected with the edging by bars of button-hole stitch, done in the same tatting cotton, the button-hole stitch being worked on two threads. A row of the same forms the foundation, and joins the scallops together. They are attached to the foundation at the edge of the three first and three last loops. The centre loop of the first leaf of one scallop should just touch the corresponding loop of the last leaf of the next.

FOR THE SCALLOP.—On beginning the first loop, leave about a yard of the thread, or more, if you can manage a long needleful. Thread this with a coarse sewing needle.



1st loop: 22 double stitches, 1 picot, 4 double, 1 picot, 4 double. Draw up the loop tightly, and with the needle do 4 button-hole stitches on the thread which connects the shuttle and loop. Make a picot on the same thread, and do 4 more button-hole stitches.

2nd: 4 double stitches; join to the last picot of the first loop, 4 double stitches; join to the next picot, 14 double stitches, 1 picot, 4 double stitches, 1 picot, 4 double. Draw up the loop tightly. Work on the thread with the needle, as after the last loop.

3rd: Like 2nd. After drawing it up work *two* button-hole stitches only on the thread.

4th (and centre): 4 double stitches, join to the last picot; 4 double stitches, join to the next; 20 double, 1 picot, 4 double, 1 picot, 4 double. Draw it up, and do 2 button-hole stitches with the needle.

5th: Like 2nd. When drawn up, work 4 stitches on the thread, pass the needle through the picot last made with the needle, and do 4 more.

6th: 4 double, join to the last picot, 4 double, join to the next; × 7 double, 1 picot, × twice; 4 double, 1 picot, 4 double. Draw it up, and work on the thread as in the 5th.

7th: Like 6th. Draw it up, and work 3 stitches on the thread with the needle; join to the last picot; 8 stitches, join to the next; 16 stitches, make a picot, 8 more, make a picot, 8 more. Now resume the shuttle. A single cluster of leaves being formed.

1st loop of the 2nd and all following sets of leaves: 4 double stitches, join to the last picot on the thread; 4 double, join to the next; 7 double, join to the picot at the point of the last leaf. 7 double, 1 picot; 4 double, 1 picot, 4 double. Draw it up tightly; do 4 button-hole stitches on the thread; make a picot, 4 more button-hole stitches.

2nd loop: × 4 double, join to the corresponding picot of the last loop, × twice. 7 double, join to the picot at the point of the 6th leaf of the last set; 7 double, 1 picot, 4 double, 1 picot 4 double.

The five remaining loops to be done like those of the first set. All the remaining sets like the 2nd. When finished every 5 form a handsome scallop. When the last of the seven is done, fasten off the needleful of thread, and break off that of the shuttle, which also secure. Each scallop is thus complete in itself.

THE WHEELS.—Leave a needleful of thread, as in the edging. × 4 double stitches, 1 picot, × twice, 7 double, 1 picot, 7 double, 1 picot, 4 double, 1 picot, 4 double. Draw it up, and work 8 button-hole stitches on the thread.

2nd to 5th loop, including both: 4 double, join to last picot, 4 double, × 1 picot, 7 double, × twice, 1 picot, 4 double, 1 picot, 4 double. Draw the loop up. Work 8 button-hole stitches on the thread.

6th (and last) loop: 4 double, join to the last picot, 4 double, 1 picot, 7 double, 1 picot, 7 double, 1 picot, 4 double, join to the first picot of the first loop, 4 double. Draw it up. Work 8 button-hole stitches on the thread, and fasten off both ends.

TO MAKE UP THE WORK.—Tack the scallops on coloured paper, lined with glazed calico; place a wheel in the centre of each scallop; work a rosette in the middle of each wheel, and connect the border and wheel with bars, covered with button-hole stitch.

If this trimming be used for straight edgings, the paper on which it is tacked should be straight; if for sleeves, it should be cut out in the proper form, otherwise the foundation line of button-hole stitches will not sit so well.

For finer trimming, for children's dresses, and delicate articles, use tatting cotton No. 3. This peculiar material has been manufactured expressly at our suggestion for this purpose, as no thread before in use was really suited for the work.

INSTRUCTIONS IN EMBROIDERY.

(Concluded from page 47.)

The next operation is to place the work in a frame, preparatory to its being embroidered. Embroidery frames should be very well made, so that when screwed together the sides and ends are perfectly *true*, as no care in working will prevent a piece of embroidery from being drawn awry, if the frame be uneven, or if it be badly placed in it.

Frames of all sorts have a piece of webbing at the top and bottom, whilst the side laths are perforated with small holes. The best are on stands, but some are of very simple construction, and only intended to be rested on the table. Whatever the kind selected, it should be sufficiently strong and stout in every part to sustain a piece of work tightly stretched in it without warping or giving way.

The selvedges of the material, whether it be canvas or any other substance, are the parts that must be attached to the sides of the frame. The ends are to be hemmed, and sewed *by a thread* to the webbing, several folds of soft paper being smoothly rolled round the bars, if the length be too great to admit of its being all exposed at once. Canvas should be herring-boned instead of hemmed. The extremities of the frame must then be stretched as tightly as possible by means of the nuts, and the selvedges braced to the side-laths by means of fine twine.

When cloth and canvas are framed together, the former must be cut rather the smaller, as it will stretch more than canvas. This is, of course, presuming that the two are ultimately to be of the same size; but very frequently the cloth (which is used to save the trouble of grounding) is much larger than the canvas.

Very large pieces of work should be lined with fine thin holland, which is first to be stretched on the frame, and then the cloth and canvas to be firmly tacked on it, particularly in those parts that are to be worked.

When a pattern is worked on canvas over cloth, the threads are frequently drawn out. The work will, however, be found to look much richer when the superfluous canvas is merely cut away closely; it also wears much better. Any small spaces of grounding intermixed with the design should then be filled in with wool of the exact shade of the cloth.

Tapestry (or as it is popularly termed, *Berlin*) work is done on canvas from painted patterns. The size of the work will, of course, depend on the fineness of the canvas and the stitch in which the design is executed. Canvas is marked according to the number of threads to the square inch which it contains. The coarsest in common use has eleven threads to the square inch, and is termed No. 8. The numbers then run in regular progression, 10, 12, 14, &c., up to 24, each number having two more threads to the inch; No. 30, however, has only four more threads than 24, or thirty-one in the inch. No. 40 has but thirty-five, and No. 50, thirty-seven.

When a Berlin pattern is selected, the size of the canvas of which it is to be worked must then be determined according to the dimensions the finished piece is intended to be. For instance, a pattern four hundred squares wide would be seventy-two inches if worked on No. 8 canvas, in cross-stitch, and half that width in tent-stitch; whilst on No. 50 canvas, it would only be twenty-two inches in cross-stitch, and proportionably smaller in tent. It must be remembered that tent-stitch occupies only a quarter of the space of cross-stitch, namely, one-half the width and length; or in other words, that four tent-stitches are worked on the space of one cross-stitch.

The principal kinds of canvas are:—

Berlin, or silk canvas,
German cotton canvas,
French, and
Penelope canvas.

Berlin canvas is made in black, white, and pearl white, and is not manufactured in any great variety of sizes. It is expensive, but requires much less labour than any other kind, as it is never grounded. Small and delicate patterns are chiefly chosen for Berlin canvas, and silks, chenilles, and beads are much employed in working them. Beads are, just now, extremely fashionable for this purpose.

German cotton canvas is very cheap, and is distinguished by every tenth thread being yellow. It is very inferior to the French, the squares being oblong, and the threads flat. Many Berlin patterns, especially such as have figures or wreaths, would be utterly spoiled by being worked on this material.

French canvas has round threads, is square in the mesh, and is altogether firmer and pleasanter to work.

Penelope canvas is so called from the threads being in fours, as if they had been worked in cross-stitch which had been picked out.

In choosing canvas, especially the expensive kind, lay it over black or any contrasting colour, that you may detect any knots or imperfections in it.

We will close these general instructions with a few observations which our fair friends will find useful memoranda, giving details of the different kinds of work, when we also furnish illustrative specimens, as in the case of the embroidered note-book (See Illustrated Exhibitor, January 3).

Always damp cloth to take off the gloss before placing it in a frame. Begin the work so that the hand shall not rest on any finished part while another is in progress. But in the case of landscapes, and other pieces where the upper part is very light, that portion must be worked the last.

Purchase enough wool for grounding before beginning a piece, as it is rarely possible to obtain an exact match.

Never use chenille, if you can avoid it, except for articles that are intended to be framed and glazed.

Choose canvas of such a size that the wool will perfectly cover, but not more than cover it, remembering that wool may be split, or used double or treble.

Never fasten off frequently in the same place, or in working silk canvas, carry the thread across any part which will not be covered by the design.

Remember that the finer the canvas, the more *distinct* must be the shades employed.

Do not wind Berlin wool, or cut it into long lengths for fine work.

Keep gold bullion, beads, and all things that are liable to tarnish, carefully wrapped in lead foil paper.

Waste as little as possible of all expensive materials, such as chenille, taking care not to have more at the back of the work than you can avoid.

Have the best needles only, as bad ones cut the silk: round eyes must be used for chenille.

An embroideress should wear a mother-of-pearl, or an ivory thimble, as even silver will spoil delicate colours.

HONITON SPRIG.

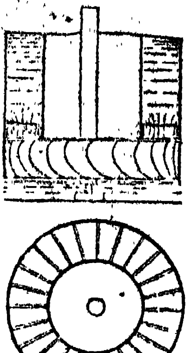
Materials.—Crochet Cotton, No. 60; Crochet-hook, No. 24. (This sprig has no stem at the end.)

14 ch., close for a loop, and work round in s.c. 27 ch., namely 10 for stem, and 17 for centre of flower. Form the 17 into a loop, round which work in s.c. Four petals surround this, made thus: × 12 ch., miss 3, s.c. in 4th, × 3 times, 12 ch., miss 3, slip at the stem. On these loops work 1 slip, 2 s.c., 10 d.c. (on 6 ch.), 2 s.c., 1 slip. Do not work on the s.c. stitch between the loops. 5 s.c. on stem chain. 14 ch., close into a loop, and work round in s.c. 5 s.c. on stem. *Leaf*: 12 ch., miss 1, slip stitch 11. On each side of this vein work 2 s., 7 d.c., 2 s.c. Make a slip stitch at the end of this leaf and the first loop, and fasten off.

(*Continued from page 199.*)

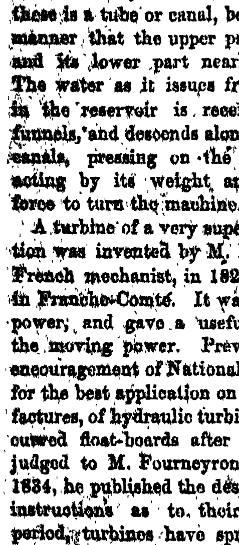
This consists of a reservoir of water in the form of a cylinder, of which the bottom, which is very thick, is pierced with holes widened at the top, to prevent the contraction of the vein or stream of water, and inclined at a certain angle, to admit of its proper action. Immediately below this trough is the wheel, of similar form, but small depth, at the bottom of which are fixed a series of funnels contiguous to each other; at the bottom of each of these is a tube or canal, bent in such a manner that the upper part is vertical and its lower part nearly horizontal. The water as it issues from the holes in the reservoir is received into the funnels, and descends along the tubes or canals, pressing on the bottom, and acting by its weight and centrifugal force to turn the machine.

Fig. 11.



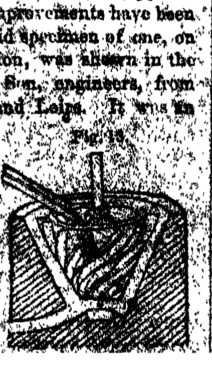
A turbine of a very superior construction was invented by M. Fourneyron, a French mechanist, in 1827, and erected in Franche-Comté. It was of six horse-power, and gave a useful effect equal to four-fifths of that of the moving power. Previous to 1832, the "Society for the encouragement of National Industry" in France, proposed a prize for the best application on a large scale, in the arts and manufactures, of hydraulic turbines, or of undershot water-wheels with curved float-boards after Belidor. This prize was justly adjudged to M. Fourneyron. In the bulletin of the society for 1834, he published the description of his machines, with practical instructions as to their mode of construction. Since that period, turbines have spread over France, and are much preferred even to overshot water-wheels; especially as they are appliable to all kinds of falls, and give quite as high a percentage of useful effect.

Fig. 12.



The turbine of Fourneyron (fig. 12) is composed of three principal parts; the wheel or turbine, properly so called, which revolves on an axis; the cylinder with its interior tube, and the sluice; the whole being made of wrought or cast-iron. The water descending through the tube, passes through fixed channels, and acts against the curved float-boards or vanes of the moveable wheel or turbine, placed exterior to and concentric with the cylindric frame, to which the channels are fixed, and round which it revolves. This machine can be made to act under water to a very considerable depth, without much diminution of its useful effect; whence by placing it, at the time of its erection, at the lowest available level, the most useful effect of the fall will be obtained at all times. Besides, it occupies little space, moves with greater velocity than other wheels, and dispenses with complex transformations of motion in its application to practical purposes. Some recent improvements have been made on the turbine in France. A splendid specimen of one, on the newest and most improved construction, was shown in the Great Exhibition, by MM. Fromont and Son, engineers, from Chartres, in the department of the Eure and Loire. It was an improved double turbine on Fontaine's principle, and was capable of being regulated by a governor like the steam-engine of Watt.

Fig. 13.

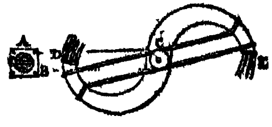


At some places on the Garonne, in France, *water-mills* are to be seen of a very singular construction; they may be classed under the head of *turbines*. They consist of a species of drum, represented in fig. 13, having the form of an inverted cone, which revolves in a similar and corresponding shaft of masonry. The vanes are applied obliquely on the surface of the drum, where they form portions of a spiral or helix. These vanes, so arranged, cause the drum or wheel to revolve with great velocity, and consequently the mill attached to its axle, by the action of a stream of water.

If in the preceding machine, the vanes are surrounded by a shrouding concentric with the surface of the drum, and making one piece with it, we have then the machine called the *Danaïde*.

Barker's mill, or reaction-wheel, was invented in the beginning of the eighteenth century, and was described by Desaguliers in his "Experimental Philosophy," vol. ii. p. 468. It was re-invented by M. Segner, and its properties investigated by D. Bernouilli and M. Euler. Latterly it received the form represented in fig. 14, which was given to it by M. Manoury d'Ectot. A vertical alimentary tube A, bent horizontally at B, and then vertically at C, brings the water to the centre of another moveable tube D C E, in the form of the letter S. The water then escaping through the orifices D and E, give to the tube D C E a rapid motion of rotation around its vertical axis.

Fig. 14.



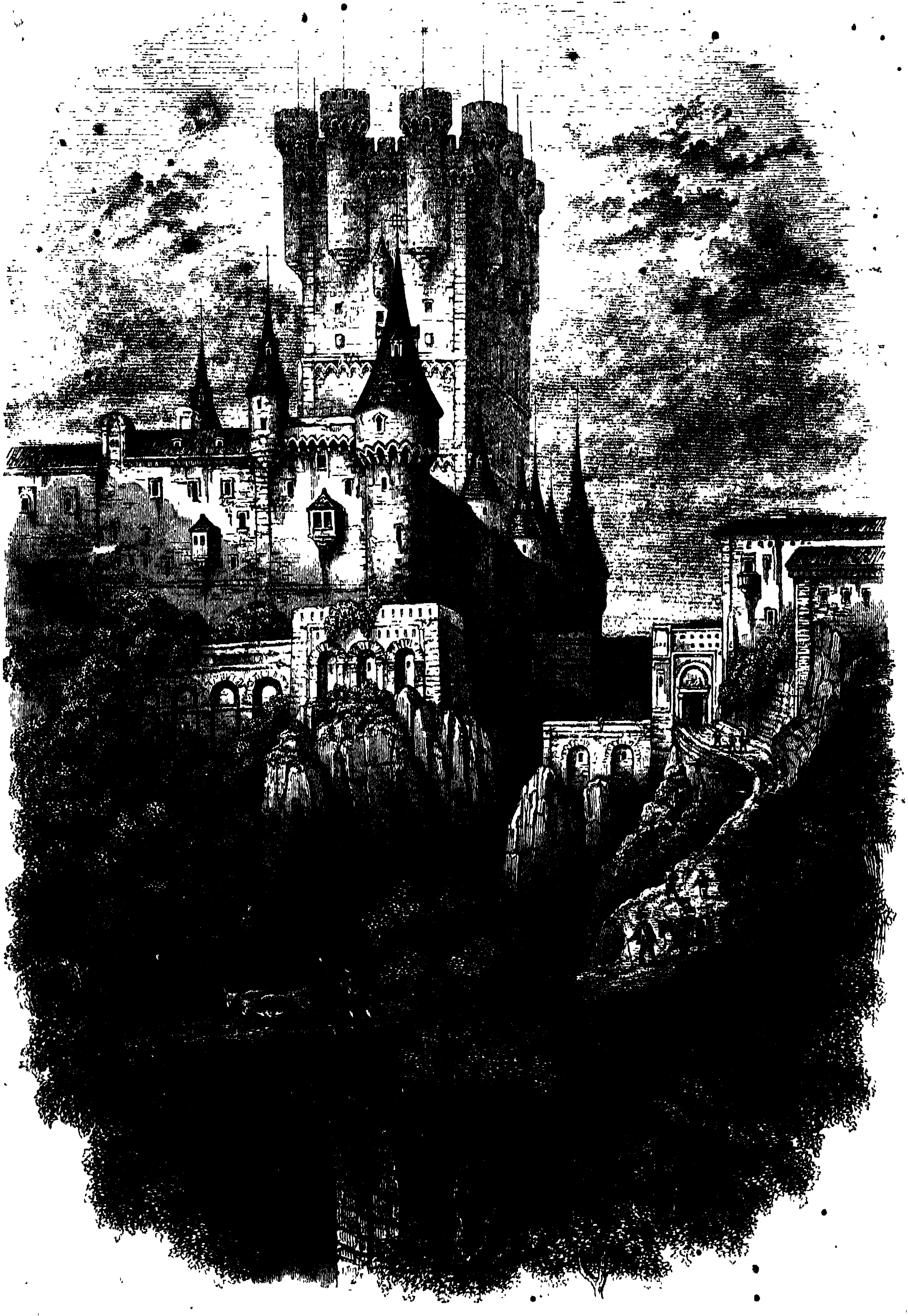
PETER MIGNARD.

A REMARKABLE instance of the imitative talent of this great artist is related by the father of the new Chancellor of the Exchequer in the first volume of his "*Curiosities of Literature*."

He painted a Magdalen on a canvas fabricated at Rome. A broker, in concert with Mignard, went to the Chevalier de Clairville and told him as a secret that he was to receive from Italy a Magdalen of Guido, and his masterpiece. The chevalier caught the bait, begged the preference, and purchased the picture at a very high price. He was informed that he had been imposed upon, and that the Magdalen had been painted by Mignard. Mignard himself caused the alarm to be given, but the amateur would not believe it; all the connoisseurs agreed it was a Guido, and the famous Le Brun corroborated this opinion. The chevalier came to Mignard:—"Some persons assure me that my Magdalen is your work!"—"Mine! they do me great honour. I am sure that Le Brun is not of this opinion." "Le Brun swears it can be no other than a Guido. You shall dine with me, and meet several of the first connoisseurs."

On the day of the meeting, the picture was again more closely inspected. Mignard hinted his doubts whether the piece was the work of that great master: he insinuated that it was possible to be deceived; and added, that if it was Guido's, he did not think it in his best manner. "It is a Guido, sir, and in his very best manner," replied Le Brun, with warmth; and all the critics were unanimous. Mignard then spoke in a firm tone of voice: "And I, gentlemen, will wager three hundred louis that it is not a Guido." The dispute now became violent: Le Brun was desirous of accepting the wager. In a word, the affair became such that it could add nothing more to the glory of Mignard. "No, sir," replied the latter, "I am too honest to bet when I am certain to win. Monsieur le Chevalier, this piece cost you two thousand crowns: the money must be returned—the painting is *mine*." Le Brun would not believe it. "The proof," Mignard continued, "is easy. On this canvas, which is a Roman one, was the portrait of a cardinal; I will show you his cap." The chevalier did not know which of the rival artists to credit; the proposition alarmed him. "He who painted the picture shall repair it," said Mignard. He took a pencil dipped in oil, and rubbing the hair of the Magdalen, discovered the cap of the cardinal. The honour of the ingenious painter could no longer be disputed; Le Brun, vexed, sarcastically exclaimed, "Always paint Guido, but never Mignard."

THE CASTLE OF SEGOVIA.



Many cities have certainly a greater right to call themselves "*Eternal*" than Rome, so many times dismantled by her enemies. Their very insignificance has given them a security which other towns have been without, and it would require a convulsion of nature, such as that which engulphed Pompeii, to bring ruin upon them, as their existence seems to be guaranteed by Providence against every attempt on the part of man. Far different from those proud and ambitious cities which draw upon themselves the vengeance of their conquerors, these towns lose nothing in changing masters, for every ruler seems to endeavour to add to the beauty and richness of their buildings.

SEGOVIA is of this number. Built in a most delightful situation among the mountains, and as ancient as Burgos, Salamanca, or Valladolid, which have the poetic assurance to consider themselves as having been founded by Hercules, it has suffered less from foreign invasions or civil war than either of its Castillian sisters. Although warlike when occasion offered, it has never striven to rival its neighbours either in power or dominion. Even at the present day little attention is directed towards it, although merited on more than one account. Though connected with the Spanish capital by two roads, it makes no attempts to extend the circle of its external relations; and in the winter any attempt to discover a comfortable conveyance across the snows of Guadarrama, which separate it from Madrid, would be quite fruitless. During three months of the year, it seems, like many Alpine animals, to exist in a lethargic sleep. Segovia lives within itself among its mountains, perfectly indifferent to the political and social convulsions which agitate the rest of the peninsula. Far different is it in summer, when the town is all life and brilliancy. That is the time to study the remains of antiquity which Segovia jealously preserves within itself against the attacks of men, who are more destructive than time itself. It was a favourite town of the Romans, who built the noble aqueduct which the Spaniards have now strangely called the "Bridge of Segovia." It is an almost cyclopean work, constructed of enormous masses of dark grey granite, joined together without any cement, and is at the present time about thirty feet in height at *Azoquejo*. We say at the present time, as the sand which has accumulated at its base takes much from its real elevation. Not a blade of grass has sprung from the interstices of the stones, and their sombre colour adds much to the grandeur of the structure.

It has always been a vexed and disputed point among antiquaries whether it was Adrian or Vespasian who constructed this aqueduct; and no inscription has ever been found which could throw the smallest light on this very obscure subject. We will not enter into the merits of the two hypotheses; it would be neither an interesting nor a profitable investigation, but we shall content ourselves with mentioning that through it a small river, the Rio Frio, flows to Segovia, and near the convent of San Gabriel, over that portion of the structure which is called the "Bridge," consisting of 320 arches, of which 35 were restored during the reign of Isabella the Catholic. It is only at deep valleys, as at the *Azoquejo*, that these arches are found, as on the hill side the water flows through a simple channel of stone.

This structure has the advantage over many other antiquities of being now as useful as it was the first day it was finished; and will probably endure for ages to come if it is able to resist the pernicious influence of the adjoining houses, many of which are of the period of Henry III., and much admired for their Gothic fronts. At the back of these houses the piers supporting the aqueduct have been undermined to form cellars and storerooms, and in other places the water has been conducted over the side by small canals to the gardens and fields on either hand, at the risk of seriously injuring the foundations by the continued dripping and moisture of the water. But in Spain such trifles are never considered worthy of a thought.

The streets of Segovia, the convents still standing, and buildings of every description, are filled with fragments of antique sculpture, probably dating from the time of the Lower Empire. The remains of sculptured animals are seen at every step, as is the case in all Spanish towns of Roman origin, but, unfortunately, their mutilated state makes it often almost impossible to form any just opinion of their merits as works of art.

It is stated that remains are still extant of Gothic edifices, but it is questionable whether the ruins, which are considered as such, are of any greater antiquity than the twelfth century.

The cathedral, commenced at the end of the fifteenth century, but only finished at a later epoch, contains many beauties of detail, without being remarkable for any grandeur or correctness of style. The stalls in the choir, carved by Bartolomeo Fernandez, a native of Segovia; several altar-screens, ascribed to Diego de Urbain; and some paintings, by Pantoja de la Cruz, are worthy of attention. The church of La Vera Cruz, consecrated 1204, and that of Santo-Christo de Santiago, contain some exquisite paintings, and several very ancient and curious tombs.

The most remarkable building of Segovia is, however, the Alcazar, rising picturesquely from the summit of an immense rock near the aqueduct, and looking down into a deep ravine, at the bottom of which flows the narrow and winding river Eresma. This formidable castle, which is flanked at each corner by an embattled turret, dates from various times. It was first founded by Alphonse the Wise, who lived within its walls, and to whom by far the greater part is attributed, though it underwent many changes during the turbulent reign of Juan II. Later still it passed through the hands of Herrera, the architect of the Escurial, who, though undoubtedly a man of great genius, still had, like Michael Angelo, a profound disdain for the works of his predecessors, and never troubled himself to preserve the original idea of any buildings with whose restoration he was intrusted. This unfortunate egoism shows itself particularly in the court-yard, the balconies, and, above all, in the grand staircase, but, fortunately, the beautiful spiral staircase which leads to the donjon remained uninjured, and under the first few steps was discovered a heap of broken but very curious arms, of great antiquity.

The interior of the Castle of Segovia is in perfect accordance with the magnificence of its exterior. Many apartments are decorated with delicate traceries and pendant ornaments, in the style of the Alhambra, and, like those of the Alcazar of Seville, were executed by Arabian workmen during the Christian dominion of the fourteenth century, for in many places the crowns of the kings of Castille may be seen, surrounded by Latin mottoes and extracts from the Koran. The most remarkable apartments are the chamber of Alphonso XI. and the portrait gallery, so called from a series of figures carved in wood and painted, representing the kings and heroes of Castille and Leon from the time of the Goths to Juanna the Mad. These figures are fifty-two in number. In the first story a small room is shown, perhaps less richly decorated, but not less elegant, than the others, where a tragic circumstance is said to have taken place in 1326. As the story goes, a lady of the court of Henry III., having approached the balcony with the infant Don Pedro in her arms, accidentally let him fall, and he was dashed to pieces, many hundred feet below, on the rocks, by the river Eresma. According to some historians, the unfortunate lady precipitated herself from the same window; others state that Henry III. ordered her to be executed. However this may have been, a monument in the chapel records the unfortunate accident, and represents the child holding a naked sword in his hand—certainly a singular kind of plaything for an infant, if it does not refer to the fate of the unhappy cause of his death.

The chapel also contains an "Adoration," executed in a masterly style by Bartolomeo Carducho.

It is only since a few years that the Castle of Segovia has been used as a military school. After having served for a long time as a royal residence, it became, under the house of Austria, a state prison, and was used for that purpose up to the convention of Bergara. The side which overlooks the town is pierced with narrow grated loopholes, which give but little light and air, and no view but that of a small portion of the sky. In the donjon several built-up cells are shown, and the dark mouths of many dungeons, which have never been fully explored.

Although this was a prison, it occasionally happened that those who were so unfortunate as to be placed within its walls were treated more as princes than prisoners; as in the case of the Duke de Ripperda, the descendant of a Dutch family, but a naturalised Spaniard, and the prime minister of Philip V., who having by his intrigues fallen into disgrace with his royal master, had the most sumptuous apartments of the Alcazar assigned to him as his prison, with a monthly allowance of three hundred doubloons, at that time considered an enormous sum. Notwithstanding all this, such is the love of liberty in the human heart, that, dissatisfied with this undeserved generosity towards him, the wily minister succeeded in effecting his escape from one of the balconies of the Alcazar with the aid of a young woman of

Segovia and his French servant, and, after turning catholic, then protestant, afterwards again catholic, he embraced the Mohammedan creed, and became a pasha and generalissimo of the Emperor of Morocco's troops. He found it impossible, however, unscrupulous and skilled in every wile and artifice as he was, to preserve his dignities and good fortune to the end, for at Tangiers a miserable hovel is shown, where he is said to have died in almost positive want, at a great age, having devoted his last years to the cultivation of plants and flowers.

THE OAK (*Quercus*).

Few forest-trees are so extensively distributed over the world as the oak. In its wild state, however, it is scarcely known in the southern hemisphere. In the islands of the Indian Archipelago it reaches its most southern limits, especially in Java; thence it passes upwards beyond the equinoctial line, and following the eastern parts of Asia, spreads to the westward along the Himalaya mountains, and reaching Europe is arrested only by the Atlantic ocean. On the other hand, running eastward of its Asiatic origin, it over-runs America, from Canada and New Albion through California and Mexico, till its progress southward is stopped by the Isthmus of Darien.

But though the *genus* is thus widely distributed, its various species are confined within comparatively narrow limits. Many of the Javanese kinds appear to be peculiar to the Indian Archipelago, or only occur near the south-eastern angle of Asia. Those of the Himalaya range are perfectly distinct from the oaks of the regions beyond, and have not even been found on the mountains of Persia. Several of the other oriental kinds have a similar local peculiarity, and the American species are, with few exceptions, found only in their own country. It will thus be seen that the different species which compose the genus *Oak* are extremely numerous—amounting probably, in the aggregate, to about one hundred and fifty. This numerical extent may, perhaps, account for the frequent mistakes made by unskilful botanists in treating of this plant, than which few have been more inaccurately described by various writers.

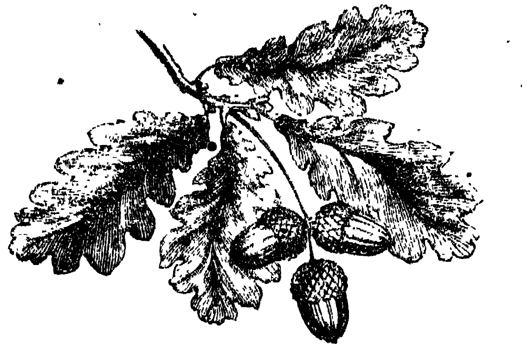
Whilst, however, the species are thus numerous and extensively distributed, they all possess, in a greater or less degree, characteristics which are common to the whole genus: hardness, durability, slowness of growth, and some other physiological peculiarities which distinguish them as a class from other forest trees. A detailed account of each of these would be incompatible with our space, but we will note down a few of the chief characteristics which belong to the species most common in Europe. These may be divided into three groups, named respectively *Robora*, or Forest oaks, *Ilices*, or European oaks; *Cerres*, or Mossy-cupped oaks.

FOREST OAKS.

The species of oak embraced in this group are mostly distinguished by their thin, drooping leaves, whose lobes are never lengthened into a bristle, and whose acorns are seated in shallow cups, the scales of which are so short and closely pressed to the sides as to form scarcely visible extensions. The following are a few of the most common of the individual species included in the group *Robora*:—

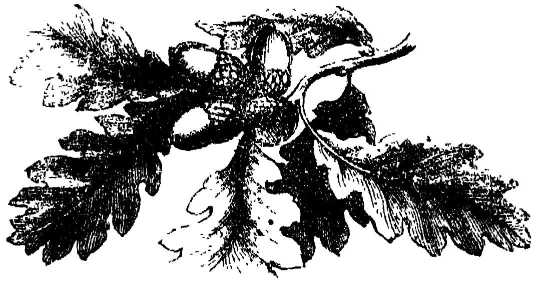
Quercus Pedunculata, or common British oak.—The leaves of this species of the plant, which are sessile, or nearly so, have numerous deep sinuosities and a thin texture, with but little polish on their upper side. Its acorns are arranged in long-stalked spikes, as seen in fig. 1. This is our commonest oak in England, and appears not to be confined to the colder parts of Europe, though certainly it is much more common in the northern than southern parts of the European continent. The hardness and durability of its timber has led to its being considered the only kind of oak suitable for the purposes of naval architecture. This impression, however, is erroneous, as the wood of the next species is equally good for ship-building. The trunk of the ***Pedunculata*** sometimes attains to a very extraordinary size. In Allonville, in Normandy, there is one whose interior, hollowed by decay, has been converted into a place of worship; and at Salcey is another, which is used as a cattle-fold. Others elsewhere have served as tanks, tombs, prisons, and dwelling-houses. The occurrence of this decay in the interior, which is the result of a species of slow combustion of the wood of the trunk, seems to be the natural termination of the life of the tree. As long, however, as enough of the tissue is spared to transmit the sap from the roots to the branches, so long does the tree continue capable of existence to an almost indefinite period. Our engraving (as seen in fig. 3, p. 212) represents a trunk in which the decay has considerably advanced.

Fig. 1.



Q. Sessiliflora, or Sessile-cupped oak.—The leaves of this kind, which are on rather long yellowish stalks, differ from those of the last in having a firm texture and much polish on their upper side. Its acorns are either altogether sessile, or are arranged in very short stalked spikes, as shown by fig. 2. The strength and toughness of this species of oak have been proved by numerous experiments, and the result has shown that in these respects it differs but little from the last. Its durability is attested by the well-known fact that the roof of Westminster-hall is constructed of it, and not of chesnut, as has sometimes been erroneously stated. It has likewise been found to be the timber of some of the most ancient buildings in this country and elsewhere. This kind of oak is distinguished by its medullary rays, or silver grain, being so far apart that it cannot easily be split. It is found all over England, but, with the exception of North Wales, nowhere in much quantity. It is a much handsomer plant than the last, and, being of speedier growth, is, therefore, more advantageous for the planter. Besides the two species of the forest oak now mentioned, there are some others, but their points of difference are too trifling to call for a detailed enumeration in a brief notice like the present. This class of oaks generally require about two hundred years to attain their full size. Their average height is then about 120 feet.

Fig. 2.



THE EUROPEAN, OR EVERGREEN OAKS.

This group, as the name given to it indicates, comprehends all European oaks with leaves truly evergreen. Those most worthy of notice are the species *Ilex*, the common evergreen, or Holm oak, with leaves ovate-oblong, acute, coriaceous, entire, or serrated, and hoary underneath. Its bark is even, and its acorns ovate, on short stalks. It is to be found all over the south of Europe, but more especially in the neighbourhood of the sea. In its wild state it grows singly or in small clusters, but not in whole forests. Its acorns are bitter and unfit for food, and its wood is hard, heavy, and tough.

A second species, which belongs to the section *evergreen*, is the *Q. Ballotta*, or Sweet-acorn oak. Its leaves are elliptical, coriaceous, entire, or serrated, very obtuse, white and downy underneath. This evergreen oak, says Captain Cooke, in his "Sketches in Spain," is one of the leading vegetable features of nearly all Spain. The native woods are formed of it in a great measure. As a species, it is quite distinct from the *Ilex*; its leaves are thicker, more rounded at the point, of a dull glaucous green, and the tree is altogether more compact and of a less graceful form. The chief difference between the two species, however, is in the acorns, which in the *Ballotta* are not only eatable, but, when in perfection, are equal, or even superior, to the chesnut. These are the edible acorns of the ancients, which they believed fattened the tunny fish on its passage from the Mediterranean to the ocean—a fable, however, which only proves that the species once grew along the delicious shores and rocks of Andalusia, which, unhappily, is not the case now.

Q. Suber, or the Cork-tree. The leaves of this species are ovate-oblong, bluntish, coriaceous, entire or sharply serrated, and downy beneath. This tree spreads over all the warm parts of Spain, but is most abundant in Catalonia and Valencia, whence the principal exports of it are made. It is of its bark that the corks in ordinary use are made.

Q. Fagınea, or Beech oak.—This tree, which is a native of Portugal, Spain, and Tangiers, is, we believe, unknown in our gardens. Its leaves are obovate, with numerous uniform shallow lobes, and downy beneath. Its fruit is sessile, and its acorns somewhat cylindrical in shape.

Mossy-cupped oak.—The species comprising this section are distinguished by their deeply-pinnatifid leaves, the long narrow loose scales of their cup, and their equally-long drooping staples. The following are the chief members of this group:—

Q. Cerris, or the Turkey oak.—Its leaves are deciduous, on very short stalks, oblong, deeply and unequally pinnatifid, and downy underneath; its lobes are lanceolate, acute, and somewhat angular. It is exceedingly common all over the south-east of Europe, where it seems to form some of the finest specimens of oak. It is more graceful in appearance and grows much faster than the British oak.

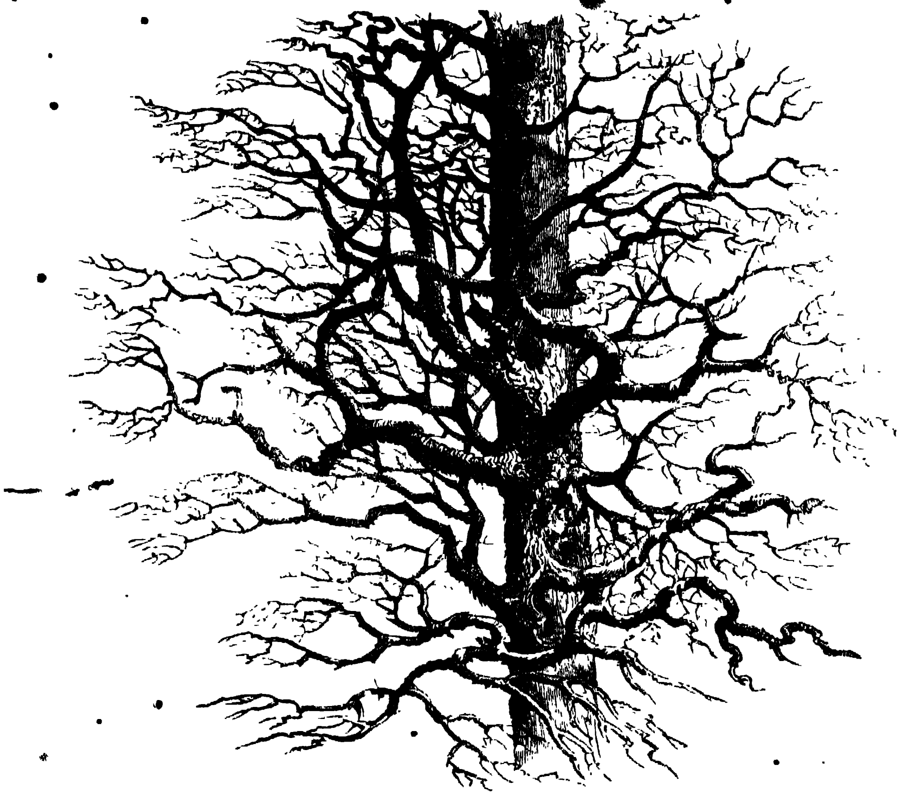
Q. Hispanica, or Spanish oak.—The trunk of this tree is corky, and its branches rather erect. The leaves are nearly evergreen, lanceolate, acute, with fine crenatures, which are sharp-pointed, coriaceous, green, glaucous, and downy beneath. Its cups are top-shaped and somewhat sessile, with prickly-spreading scales. It grows, as its name indicates, in Spain, and is found likewise by the Algerine river Monchique.

Q. Austriaca, or Austrian oak, is found in Austria, Hungary, and some other of the adjacent countries. It differs from the Spanish oak chiefly in its leaves being larger and more deeply sinuated, and in the greater size of its acorns.

Fig. 3.

These brief remarks on some of the European species of "the brave old oak" may not be uninstructive. From the earliest ages it has been considered the king of European trees, and was connected with the most ancient religious rites and ceremonies of most of the continental nations; especially amongst the Greeks, Etrurians, Germans, Celts, and Scandinavians. The oak at Dodona, in North Greece, was the seat of the oldest Hellenic oracle, whose declarations the priests, in their paroxysms, sent forth and promulgated on leaves. The oak, which was sacred to Zeus himself, was the tree *par excellence* to the old Greek, and from it he called his wood-nymphs "nymphs of the oak;" and the very lives of these supernatural beings were bound up with their tree. So, everywhere, in the old worship of nature, the worship of the oak was associated with, and called forth by, the material bounties which the tree conferred upon the untutored sons of nature. The fruit of the living oak fed them, and the hollow trunk of the withered one provided for them a dwelling. Not less venerated by the other nations mentioned, should we find it if we examined their religious rites and ceremonies. The very name of the Celtic priests, the *Druids* (from δρυς, "an oak"), shows how intimately it was associated with their worship too, even if the independent proof of it which exists were wanting. Maximus Tyrius, a Greek writer, in treating of the system of the Druids says—Αγαλμα Διὸς Κελτικοῦ ὑψήλη δρυς, "the form of the Celtic Jupiter is that of a towering oak." The Cymri, again, who were a northern people, and evidently of the same origin as the old German *Cimbri* and the *Cimmerians* of North Greece, called the oak *Derwen*, and their priests *Derwydd*. By the Scandinavians, too, it was held in equal reverence. A more detailed examination of the extent to which it was mixed up with the sacred rites and mysteries of these nations, would be not only interesting, but instructive, if space allowed. But the few facts which we have mentioned are for the present sufficient to show how much the oak has been valued in Europe from the earliest times. And though its religious associations and uses have passed away with the barbarism out of which they sprung, its usefulness and beauty still entitle it to the rank of king amongst our forest-trees. Its peculiar strength and durability have long made it the chief element in the wooden walls of England, and led to its use wherever these two characteristics are required. It has other qualities, however, which commend it equally to the service of art. How largely it furnishes both the material, and, from its foliage, the design of the carvings of the middle ages, no one acquainted with the character of Gothic art need be informed. Nor is this the only connexion in which it elicits artistic admiration. The solid and towering grandeur of its trunk, the tortuous irregularities of its branches (as seen in fig. 4), and the beauty of its foliage, are too striking to be overlooked by the painter. Few who have visited the picture gallery in Dresden will forget Rubens' "Boar Hunt in an Oak Forest."

Fig. 4.



JOSEPH MALLORD WILLIAM TURNER, R.A.

AMONGST the many remarkable individuals who have been removed from the busy scenes of life within the last five eventful years, probably not one has left so many enduring records of his genius and his fame as the one whose name stands at the head of this article. Like many of the great men of the present age he owed nothing to fortune, and during the whole course of his long and successful career, he left nothing to her which could be accomplished by industry and perseverance. There is not perhaps, in the annals of biography, a more remarkable instance of what may be achieved by the force of intellect and the weight of personal character against any odds however great. Turner was born in all but the lowest rank of life. His father was a hairdresser, and followed his calling in the house [illegible]26, Maiden-lane, Covent-garden, where the great artist first saw the light. The day of his birth is not known, as he always, as if studiously, concealed it; but he was christened at the parish church of St. Paul's, on the 14th May, 1775. His great reserve and extreme dislike to allow anything more to be known about him than he could help, have rendered the details of his personal history but scanty and incoherent. But the mystery by which he surrounded himself and his doings only rendered the curiosity of the public the more intense, and from time to time as much of the incidents of his early career have leaked out as may serve to give a tolerable idea of the man whose mighty works have excited so much admiration.

His taste for art, and brilliancy of colouring, were early displayed. The first manifestation of a peculiarity which is more or less traceable in all his works, is said to have been called forth by seeing an emblazoned drawing of a coat of arms lying on the table of a gentleman, to whose house he had accompanied his father to see him dress the owner's hair. Upon his return he set to work and succeeded in making a very fair sketch of the lion which formed part of the armorial ensigns. After this, he devoted the greater part of his time to drawing, and singularly enough, aspired thus early not merely to copy well, but to sketch from nature, and for this purpose made frequent excursions into the fields in the neighbourhood of London. It was fortunate for him that his father had the good sense and discrimination to see where his son's talents lay, and to place no obstacle in the way of his following the bent of his inclination.

An acquaintanceship which he formed with Girtin, who was the first to introduce drawing with water-colours upon cartridge paper, was the means of enabling him to turn his artistic pursuits to practical account. Turner and Girtin, were employed, when both mere boys, to colour prints for Mr. John R. Smith, of Maiden-lane, a mezzotinto engraver and portrait painter of considerable celebrity.

The former was afterwards introduced to Powden, the architect, and by him employed to put foregrounds into his architectural drawings. It was considered by many of his friends that this was a favourable opportunity for young Turner to make a good start in life, by apprenticing himself to Powden, but from reluctance on his own or his father's part, or his reliance upon his powers in other departments, the plan never received any serious consideration from either of them. Advancing step by step, the young artist began to teach water-colour drawing in schools at five shillings a lesson—then at ten, and finally raised his terms to a guinea. He was now employed by publishers to make drawings for some of their works. He made an excursion to Oxford, and there was engaged to sketch some views for the "Oxford Almanack," which was the means of bringing his talents under the notice of several noblemen and gentlemen more or less connected with the University.

At an early period he entered himself as a student in the Royal Academy, and for five years continued to labour in his vocation with the utmost assiduity in his father's house in Maiden-lane, and afterwards, for five years, in apartments which he took in Harley-street. In his fifteenth year, the second of his studentship in the Academy, he exhibited his first picture—"View of the Archbishop's Palace at Lambeth." It was a water-colour drawing. During these ten years he exhibited no less than fifty-nine pictures, and in 1800 was elected an associate. His "Rising Squall, Hot Wells," from St. Vincent's Rock, Bristol, was the first of his works in which he displayed the wonderful mastery of effect for which he afterwards became so celebrated. He continued to execute drawings from a variety of objects, the sale of which afforded him the means of visiting various parts of the kingdom, and studying nature under every aspect. In this way some of the finest scenes in Yorkshire, Westmoreland, Cumberland, and Northumberland, have furnished subjects for his pencil. In every one he endeavours to display his observation of some novel combination in nature—storm and sunshine, murky clouds, and lowering tempests. He thus exactly hit the public taste. People had begun to be tired of the ever-recurring "moonlight scenes," clear skies, and calm waters. Thus, Buttermere Lake he chose to represent under a shower; Norham at daybreak (not as Sir Walter Scott drew it afterwards, at day-set, in the opening of "Marmion"); and under the colour of a "View of Dunstanburgh Castle" he gave us an effect of sunrise after a squally night, with a taste of the wild coast of Northumberland, and only a distant peep of the castle from which the picture derived its name. Other favourite effects with him at this time were—a hazy sunrise, clearing up after a showery day, and the approach of a thunderstorm at sunset. He was thus early attentive to the varieties of nature, and copied her with a master's hand. He had not yet begun to make "additions" to nature, and to think, with Sir Godfrey Kneller, that, if his assistance had been sought at the beginning of the world, the world had been a more beautiful one than it now is. In the two years during which he was an associate, he exhibited, in all, fourteen pictures, and in 1802 was elected a member of the Academy. Up to this period he had mostly painted in water-colours. He now began to turn his attention to oil. He had already drawn a great number of his subjects from scenes upon the coast and incidents connected with maritime life. In order to create a greater variety, and add to his stock of experience, he took a trip to Scotland, Switzerland, and the Rhine, and the result was his splendid pictures "Edinburgh from the Calton-hill," "The Festival upon the opening of the Village of Maçon," "The Falls of the Rhine at Schaffhausen," &c. Recurring before long, however, to his combination of natural phenomena, for the purpose of producing effect, he painted and exhibited, in 1807, "The Sun rising through Vapour," "Fishermen Cleaning and Selling Fish," and another which one would think less adapted to his powers, "A Country Blacksmith disputing upon the price of iron and the price charged to the Butcher for shoeing his Pony." Everyone knows how highly-coloured all Turner's pictures were. These two were no exceptions to the general rule, and this, added to the great ability which was, of course, displayed in their execution, was near being the means of seriously injuring the picture of another and younger aspirant to fame, which was hung between them: this was Wilkie's "Blind Fiddler." A day or two previous to the Exhibition, Turner had reddened his sun, and blew the bellows of his art upon the blacksmith's forge, so that the modest hues of the poor Scotchman's painting were completely eclipsed. "This," Turner said, "was to put the Scotchman's nose out of joint, who had gained so much reputation by his Village Politicians." Wilkie felt this severely, but never resented it.

The great secret of Turner's fame was his constant recourse to nature, and his wonderful activity and power of memory, coupled with great natural genius, and indifference to praise. His religious study of nature was such, that he would walk through portions of England, twenty to twenty-five miles a day, with his little modicum of baggage at the end of a stick, sketching rapidly on his way all good pieces of composition, and marking effects with a power that daguerreotyped them in his mind with unerring truth at the happiest moment. There were few moving phenomena in clouds or shadows which he did not fix indelibly in his memory, though he might not call them into requisition for years afterwards.

When the Pantheon was burned in Oxford-street, in 1792, he chanced to be passing by the spot on the following morning, and observed huge icicles depending from various parts of the ruins. He instantly sketched it, and the result was a very striking painting of the scene which was exhibited at the Royal Academy in the May following. This is an instance of his eager watchfulness to turn every passing incident to professional account. He could not walk the streets of London without seeing curious effects of light and shade in the smoke issuing from the chimneys. His pencil was ever in his hand, ready for everything that might turn up, and his clear recollection of the minutest details of scenes which he had once closely examined, frequently excited the astonishment of his friends.

Amongst the works which confirmed his reputation are a "Spithead's Boat's Crew receiving an Anchor," "Lowther Castle," "The Deluge," "The Gale at Sea," and the "Guardship up the Nore."

He published the "Liber Studiorum," in imitation of Claude's "Liber Veritatis," but on a much larger scale. It contains an immense number of drawings which possess the highest excellence; so that in the wide range of subjects which it embraces, Turner has shown that there was no department of art in which he could not shine. In 1811, he undertook in conjunction with the Cooks, to make a series of sketches of the picturesque scenery on the southern coast, and the result was a work of surpassing beauty and truthfulness. And the engravers seem to have entered fully into the spirit of the drawings. His pictures, as might naturally be expected in the case of a man whose life was so long, and whose industry was so indomitable, have found their way into many hands. "Echo," "Evening," "The Thames at Eton," "The Thames at Windsor," "Chichester Canal," "Petworth Park," "Brighton Pier," "Tabley House and Lake, Cheshire," are at Petworth. "The Gale at Sea," one of his finest works, if not *the* finest, is in the Bridgewater Gallery. "The Festival at the opening of the Vintage at Marva," is in the possession of Lord Yarborough. In the Vernon Gallery is "William III. landing at Torbay," and various others adorn the cabinets of private individuals. No one, however, has so large or so varied a selection of his works as Mr. Windus, of Tottenham-green. Every variety of style which Turner attempted, from his earliest to his latest works may here be seen and admired. Mr. Rogers, the poet, has his "Stonehenge." He made an immense number of drawings for booksellers and print publishers, and it is said that he was anything but an easy customer to deal with. His great tact in bargain-making here came into full play, and as his high standing and great wealth placed it in his power to name his own price, he exercised his privilege without mercy or scruple; and we may safely aver, avenged the wrongs of thousands of poor authors and artists in one swoop. He drew the illustrations for Rogers's "Italy," and the vignettes for Brydges' edition of Milton.

There never was a more diligent follower of his profession than Turner. From his boyhood he was an extremely early riser, and being little given to amusement of any sort, disliking society, and having but few friends, it is hardly an exaggeration to say that his whole life was devoted to the practice of his art. But as he allowed no one to be on terms of what may be termed intimacy with him, nothing was known of the process by which he brought about the wonderful effects upon canvas which the public so much admired. Upon everything connected with himself he maintained the strictest reserve. He had no relations except one or two cousins, and these knew but little of him, or he of them. No one, we believe, except Lord Egremont at Petworth was ever admitted to his studio. It was one of Turner's foibles to veil everything he did in mystery. The secret by which he produced some of his curious colouring will probably remain a secret for ever. When his pictures appeared on the walls of the academy at the annual exhibitions, none knew when they had been painted, and none dared to ask him. He was once told that an eminent publisher boasted that he had been admitted to his studio. "How could you be such a fool as to believe him?" was the gruff reply. No one ever stole a march upon him but Chantrey the sculptor, and probably few men knew Turner as well. Both being of silent and somewhat retiring disposition, they loved fishing as well as art, and thus a strong sympathy sprung up between them, which was probably the more sincere on Turner's part, since Chantrey did not follow painting as a means of living. There was thus no ground for jealousy.

It is related by a recent writer, that when Turner was at Petworth upon a professional visit, he kept the door of his studio locked, no one but Lord Egremont himself being admitted; and that there might be no mistake, there was a peculiar knock agreed upon, by which the artist might understand that it was his patron who sought admittance. Chantrey made himself master of the secret by bribing one of the servants, and having given the required signal, Turner upon one occasion opened the door to him. His vexation upon seeing the trick may be readily imagined, and probably no man but Chantrey could have succeeded in pacifying him. No professional painter could perpetrate such a ruse with impunity. This littleness, combined with so much greatness in the same individual, is one of those anomalies in the history of the human mind which will in all probability never be satisfactorily explained. How a man, who had conceptions so just of truth, sublimity, and beauty, whose mind was ever soaring in those upper regions where the petty weaknesses and foibles of humanity shrink into the most insignificant proportions, could condescend to surround the practice of the noblest of professions with the assumed mystery of a quack doctor or strolling mountebank, we are at a loss to conceive. It is, after all, possible to love art and be a worldling.

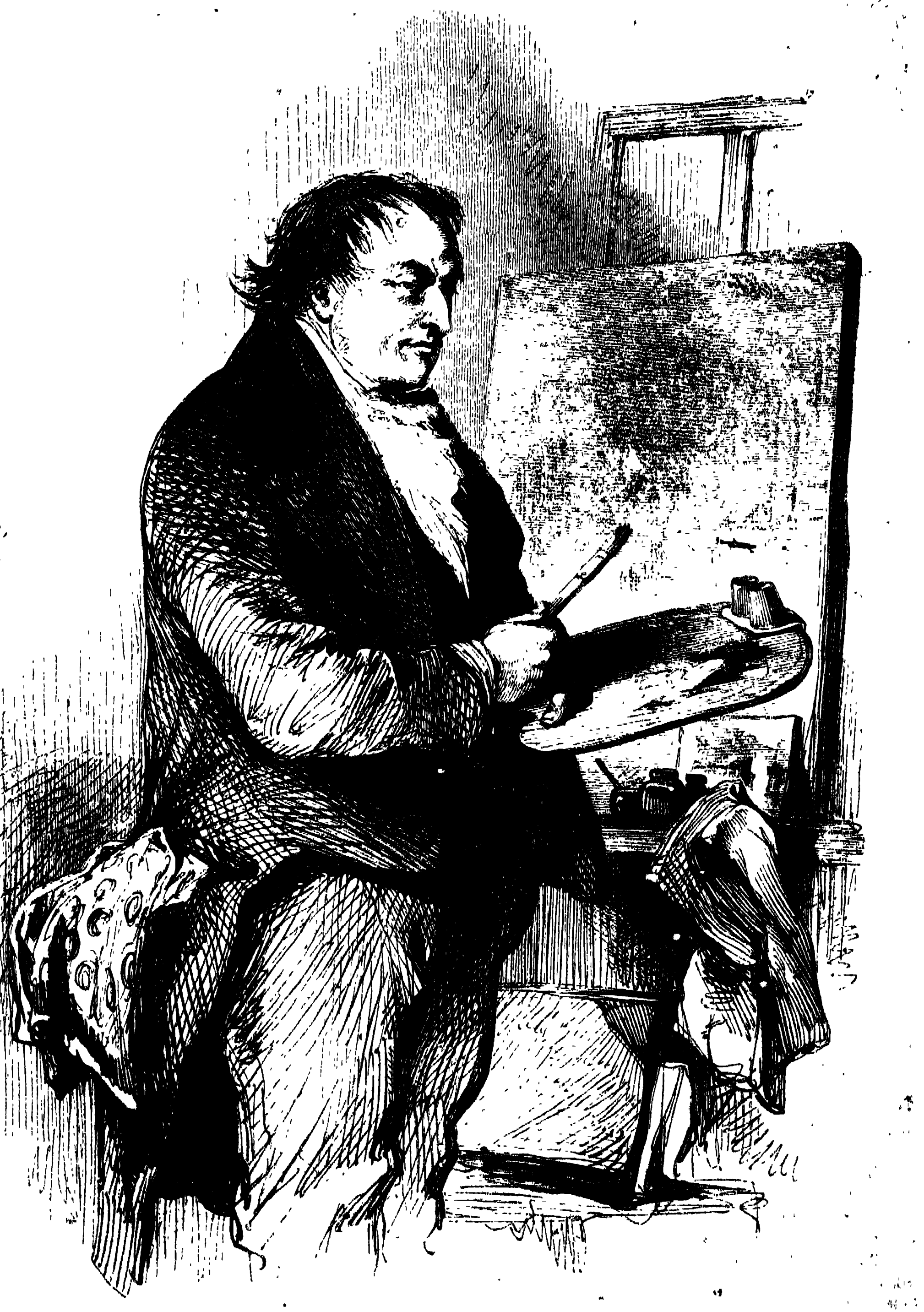
Another instance of his reserve was his invincible repugnance to have anything known about his age or his birthday. The consequence is that all statements as to his age are mere conjectures. That marked on his coffin was seventy-nine, but other accounts state that he must have been beyond eighty. He had an old and faithful servant who lived with him for forty-two years up to the time of his death, and who humoured his master's whims with praiseworthy assiduity. It is hardly necessary to say that he never married. The only artists for whom he had much respect or veneration were Reynolds, Girtin, and Stothard. For the works of the latter in particular he had the profoundest veneration. He is stated to have remarked when speaking of him to one of the professors of the academy, "I wish he thought as much of my works as I think of his. I consider him the Giotto of the English school."

One of the strangest instances of his eccentricity was that he never would consent to have his likeness taken, except when a young man, when he sat for one of a series of portraits of members of the Royal Academy. In appearance he was uncouth and burly, looking very like a Norfolk farmer, and without a bit of poetry or sentiment either in his figure or physiognomy. It is said, we know not with what truth, that he was, therefore, afraid that familiarity with his personal appearance would diminish the effect of his paintings. Nevertheless, all his efforts were ineffectual to prevent his likeness being taken. It appears Mr. Smith, of the British Museum, sketched him; Count D'Orsay sketched him at an evening party; and at last Mr. Linnell succeeded in securing a portrait of him in oil, half size, by means of a pardonable stratagem. The Rev. Mr. Danniell, an intimate friend of the great artist, invited him frequently to dinner. Mr. Linnell, too, was always present; and by a series of sketches taken part upon his thumbnail and part upon pieces of paper, was at length successful in securing a very striking likeness on canvas. It was afterwards sold to a Mr. Burch, a gentleman living near Birmingham, for two hundred guineas. Another was secured by Mr. Charles Turner, an intimate friend of the great artist, in a somewhat similar manner, by a number of sketches made at different times. The result was an excellent portrait in oil.

The opinions entertained regarding Turner and his works by the world of art, and every other world, are, of course, as in the case of all other great men, and particularly of all great painters, various and conflicting. But probably few men have received a greater share of contemporary praise, and upon none have the arrows of censure fallen so lightly. It is not always that a prophet is honoured in his own country, nor yet in his own age. Great men have sometimes outlived calumny, misrepresentation, and ignorant depreciation of their works, but oftener by far have they been outlived by them. It is only lapse of time, patience, the death of narrow prejudices, and paltry interests, and rancorous jealousies, that can remove the mist and obscurity which too often surround great men and great deeds during the lives of the owners and doers. It is the way of the world to render justice only when the injured are beyond the reach of reparation, and to pay merited tributes only to the dead. And in matters relating to art, though the standard of excellence be none other than absolute truth, yet the organs by which we receive our impressions of that standard are so liable to deceive us, are so imperfect and so different in different men, that all never have a similar opinion as to the merits of any work which appeals to the external senses only, to stamp it as faithful to its object and design. Turner was not exempt from the evil consequences which flow from all these wrongs and misconceptions. Though he was early celebrated as a painter of wild and vigorous imagination, the admirers of the old masters denounced him as an innovator; and Wilkie, who associated tone with great depth and force, thought Turner was getting into "a weak, vapid manner of painting." The public for a long time neither understood nor appreciated him. His "Polyphemus deriding Ulysses" was sneered at, and so were many others of the finest but least *regular* of his works. But it soon became evident that he was one of those men for whom rules were never made, but who make them for themselves. He had the utmost confidence in his own powers, and the fixed determination that his excellencies, whatever they might be, should come from sources entirely within himself. It was in "Van Tromp returning after the battle, off the Dogger-bank," and the two first of the series of "Venetian Views," that he fully displayed his wonderful mastery of all the tints and shades and shapes of atmospheric phenomena, glancing water, and many coloured architecture, and placed himself at once above the reach of criticism. After this the reaction in his favour was instantaneous and violent. He was caressed and admired by all. His very faults were looked upon merely as the pardonable eccentricities of genius. A "Graduate of Oxford" wrote a book upon "Modern British Painters," and openly declared that no words which he could command, could express his admiration of Turner's works, and every one of his morals, canons, and precepts are pointed, illustrated, and enforced by reference to them. Much of what he, as well as everyone else, said of the artist and his works, was true and just, and much was but the froth of popular exaggeration. But let it remain on record as a warning to all hero and idol worshippers, that Turner declared that the Oxford Graduate "knew more about his paintings than he did himself, and that he put things into his head, and pointed out meanings in them, that he never intended."

It has been doubted by some whether all this fame and applause was not too great to be lasting, and whether the calmer judgment of posterity will not reverse the decisions of contemporary criticism. But of that there can be but little fear—

> " A thing of beauty is a joy for ever; its loveliness increases,
> It will never fade into nothingness."



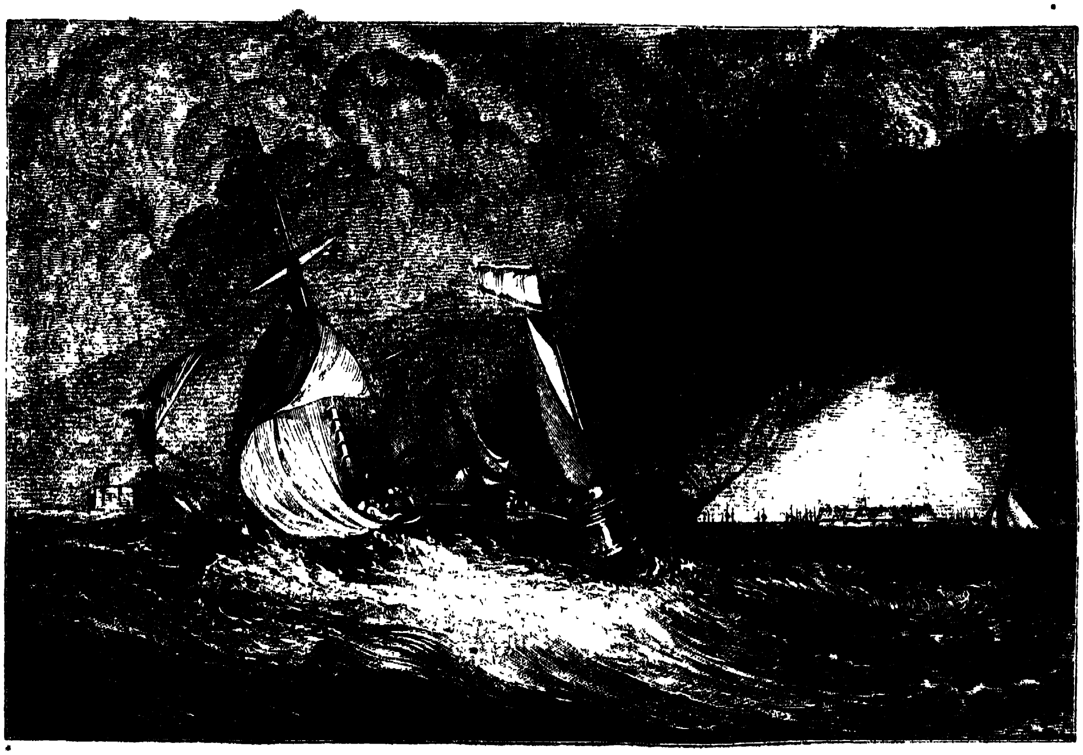
J. M. W. TURNER, R.A. DRAWN BY J. GILBERT; ENGRAVED BY W. J. LINTON.

And in all Turner's works there is enough of the glorious and beautiful to secure to their author an immortality of fame.

He died on the 23rd of December, 1851, in an obscure lodging at Chelsea, where during the latter years of his life he had lived in the strictest retirement, and under an assumed name. By great parsimony he amassed a fortune of £100,000; and whatever opinions might be entertained during his lifetime of his miserly habits, since his death it must be acknowledged, that at least he did evil that good might come. His whole property he left for the foundation of almshouses for the benefit of unfortunate and meritorious artists, and directed that £1000 should be appropriated to the erection of a monument to his memory in connexion with it. Curiously enough, he excludes water-colour painters from all benefit under this bequest. Forty or fifty of his finest paintings he retained in his own possession till his death, having always refused to part with them upon any terms. All of these he has bequeathed to the National Gallery, upon condition that within ten years a suitable room be set apart exclusively for their reception. Amongst these are the "Death of Nelson," the "Burial of Wilkie," the "Teméraire," and the "Frosty Morning." The last named picture produced a great sensation when it was first exhibited.

He was buried in St. Paul's Cathedral on the 30th of December, 1851, by the side of Sir Joshua Reynolds, and near Barry and Sir Christopher Wren. The place was his own selection, and a fitter one could not have been chosen, for here he was surrounded by all the masters of English art. The dome of that mighty cathedral looks down upon the last abodes of many of the greatest of our dead, but we venture to say, that not one has done more for the best and truest interests of his country, not one has laboured more earnestly and more successfully to fulfil the mission he received from God than Joseph Mallord William Turner.

The accompanying engraving, which is taken from one of Turner's paintings—"The Mouth of the Humber," a storm approaching at sunset"—illustrates his peculiar style better than any other we know. The murky, blackening clouds, the water rising into foam, the castle and town in the distance, and the last rays of the setting sun streaming half-gloomily through the gathering storm, are all portrayed in Turner's best style, and well exemplify the accuracy of his observation of atmospheric phenomena. Our engraving, by W. [illegible] Linton, is a faithful rendering of the original.



THE MOUTH OF THE HUMBER. ENGRAVED BY W. J. LINTON, FROM A PAINTING BY TURNER.

THE STEREOSCOPE.

"THIS simple and remarkable instrument produces effects altogether novel. Allow me to place it in your hand, bring its two glasses to your eyes, and then favour me with the result."

"I see with the greatest distinctness a cube; it appears perfectly solid, and stands out fully from the slab on which it appears to have been placed."

"Just so. Now look again."

"Why, that is a globe, a complete sphere, unlike any drawing or engraving I ever beheld, and looking as if, were the board on which it stands but slightly tilted, it would immediately roll off."

"Exactly. The instrument is one of the many deeply interesting inventions of Professor Wheatstone, and though described by him in 1838, is only now, strange to say, attracting the attention that is due to so original and ingenious a contrivance. It is called "The Stereoscope," from two Greek words meaning *to see that which is solid*; and how completely it produces such effects, you are now fully persuaded. But I will ask you to look at a few more objects. How, for instance, might that one be described?"

"Certainly as a splendid geranium in a garden pot, from which the noble plant stretches itself out in every direction, while its flowers are in their highest beauty. It is the very thing itself; and it seems as if I could put my hand in among the branches and leaves, and gather any one of the rich scarlet blossoms which I chose to select."

"I have not the slightest doubt of it. Here is another object."

"That is a piece of sculpture in high relief. That aged woman is pointing out the young one's fortune, according to the old superstition, in the grounds of the tea cup. How beautifully solid the cup and the left hand that holds it appear, while no less so are the body and the face, and the right hand with the raised forefinger pointing to the imaginary omen. Equally perfect is the form of the young woman whose back is towards me, and whose head and face are slightly turned that she may curiously pry into this supposed disclosure of the coming time. But every part is equally good; it appears to me as a piece of sculpture, in high relief, beautifully executed. Have you anything more to show me

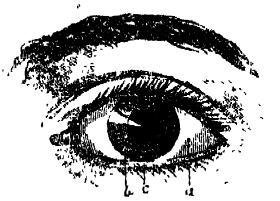
"Yes, but only one, though you will suppose correctly that objects might be indefinitely multiplied."

"Astonishing! It is a family scene, the very counterpart of life. The father is seated away from the wall, each part of his form having on it the exact degree of light and shade, so that the body advances beyond the face, and the legs beyond the body, and the left leg beyond the right over which it is cast; and even the foot, which is protruded, is perfectly natural. The mother, too, is as completely represented, while the child sits in her lap with a distinctness which I never saw equalled. No less striking in their way are all the accessories. The table appears the nearest, standing out with all the solidity of rosewood or mahogany; the work-box, with its inlayings, its open top, its satin lining, seems a little retired; and just behind it is a vase of flowers, all distinct as they are in beauty and fragrance. Most assuredly, I never before saw such objects in a glass; their size is the only drawback to the impression of their absolute reality."

The reader, who has had the opportunity of over-hearing this conversation, will probably feel some curiosity to know how effects so novel and astounding are produced. We proceed, therefore, to gratify this natural and proper feeling, with the remark, that it is absolutely necessary to glance, primarily, at the physiology of that most amazing of all optical instruments — the human eye, at least so far as the visual power is concerned, in order to the right appreciation of the stereoscope.

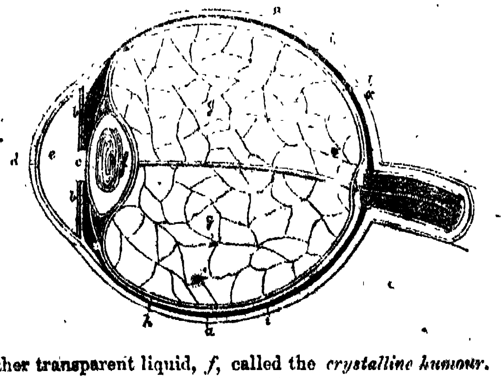
The white of the eye (fig. 1.) called the *sclerotica*, an opaque substance *a*, has the *cornea* fixed in it, like a glass in a watch-case, which also is transparent and colourless, and covers in *b* and *c*. The *iris b*, is the coloured circle which surrounds the *pupil*, *c*, varying in different persons, so that it is sometimes hazel and at others black or grey, and is an opaque curtain in the inner chamber of the eye. The pupil in the centre of the iris may be so enlarged or contracted as to admit a larger or smaller stream of rays, according to the intensity of the light. The same letters are applied to the same parts in fig. 2.

Fig. 1.



Within the cornea *d*, is a small chamber filled with the *aqueous humour*, a transparent liquid, *e*. Behind this is a substance in the form of a double convex lens, which contains another transparent liquid, *f*, called the *crystalline humour*. At the back of this lens is the *vitreous humour*, *g*, distending the eye into its spherical form, so that it may freely move in its orbit. A straight line passing through the centres of the cornea and the ball of the eye, is called the *optical axis*, or the axis of the eye. The play of the eye-ball is of considerable extent. For the optic axis can turn in the horizontal plane through an angle of 60° towards the nose, and 90° outwards, giving an entire *horizontal* play of 150°. In the vertical direction it is capable of turning through an angle of 50° upwards and 70° downwards, giving a total *vertical* play of 120°. The arrangement of muscles is like all the arrangements of the all-wise and beneficent Creator, in the structure of the human eye, exquisitely simple and beautiful, and absolutely perfect. One muscle raises the eye, another moves it outwards towards the temple, a third directs it towards the nose, while a fourth restrains the rest within due bounds, and keeps the visual power steadily fixed on the object to be contemplated.

Fig. 2.



The *retina*, *h*, an expansion of the optic nerve, is a most delicate membrane, and the immediate seat of sensation. And the *choroid*, *i*, originating around the entrance to the optic nerve, which passes through it before it expands into the retina, consists almost entirely of a multitude of minute vessels, curiously interlaced and communicating freely with each other. The outer surface of the choroid is somewhat rough and flocculent, while the inner, on which the retina is expanded, is delicately smooth and even; and both are abundantly covered with a pigment, which is secreted by every part of the choroid, and pervades its loose and porous texture.

With this understanding of the structure of the human eye, there will be no difficulty in conceiving aright of its usual action. The light proceeding from any luminious object, as the sun, a lamp, or a candle, and falling upon that part of the eye-ball which is left uncovered by the eyelids, passes through the pupil, and being refracted by the humours within, and finally penetrating to the retina, are received by it, and produce there an illuminated image of the luminous body.

The truth of this representation may easily be brought to the test. For if the eye-ball of an ox recently killed have the hinder part dissected, so as to lay bare the choroid, and a lamp be placed at a distance of eighteen or twenty inches before it, an inverted image of the candle will be visible through the retina, as if it were produced on a plate of ground glass or on oiled paper. The images of objects painted on the retina, therefore, give rise to the perceptions formed by the mind, of which the eye is an exquisitely constructed and wonderfully ordered instrument. How extremely minute these images are appears from the fact that, supposing the eye to be an inch in diameter, and the sails of a windmill, six feet in diameter, were seen at the distance of 4000 fathoms, its picture on the retina will be the one-eight-thousandth part of an inch, which is the six hundred and sixty-sixth part of a line, or about the sixty-sixth part of a common hair! To take another instance, the figure of a man five feet ten inches in height, seen at a distance of forty feet, produces an image on the retina the height of which is about the one-fourteenth part of an inch. The face of such an image is included in a circle whose diameter is about one-twelfth of the height, and, therefore, occupies on the retina a circle whose diameter is about the 1-170th part of an inch; yet within this circle the eyes, nose, and lineaments, are distinctly seen. The diameter of the eye is about one-twelfth that of the face, and, therefore, though distinctly seen, does not occupy upon the chorgid a space exceeding the 1-4,000,000th part of a square inch.

It has already been stated that the images of objects appear *inverted* on the retina, and a knowledge of this fact has led to the inquiry, why do not visible objects appear upside down? "The answer to this," says Dr. Lardner, "appears to be extremely simple. Inversion is a relative term, which it is impossible to explain or even to conceive without reference to something that is not inverted. If we say that any object is inverted, the phrase ceases to have meaning unless some other object or objects are implied which are erect. If all objects at a time held the same relative position, none can be properly said to be inverted; as the world turns upon its axis once in twenty-four hours, it is certain that the positions which all objects hold at any moment are inverted with respect to those which they held twelve hours before, and to those which they will hold twelve hours later; but the objects as they are contemplated are always erect. In fine, since all the images produced upon the choroid hold with relation to each other the same position, none are inverted with respect to others; and as such images alone can be objects of vision, no one object of vision can be inverted with respect to any other object of vision; and, consequently, all being seen in the same position, that position is called the erect position."

Another peculiarity in visual arrangements has suggested the question, "As we have two eyes, why do not objects appear to us *double?*" In answer to this, Dr. Arnott replies, "We shall only state the simple facts of the case. As in two chess-boards there are corresponding squares, so in the two eyes there must be corresponding points, and when on those points a similar impression is made at the same time, the sensation or vision is single; but if the impression be made on points which do not correspond, owing to some disturbance of the natural position of the eyes, the vision becomes double."

A clearer explanation of the phenomenon may, however, be given, for it is easily shown that any near object is seen in two different modes by the two eyes. If a thin book be held up in such a manner that the back shall be exactly in front of the nose, and at a moderate distance from it, it will be observed that by closing first one eye and then the other, that the perspective view of it differs, according to the eye with which it is beheld. With the right eye, the right side will be seen very much fore-shortened, a corresponding view will be gained of the left side, but the lengths of the different lines will be found to vary in the different views. On looking at either of these views singly, the only notion of solidity that can be acquired is that to which the mind is led by the association of such a view with the *touch* of the object it represents.

That each eye supplies an image, and that the coalescence of the two gives to the mind the perception of *solidity*, is demonstrated by the stereoscope. Within it are placed two plane mirrors, inclined with their backs to one another, at an angle of 90° degrees, and thus resemble the retinæ of the eyes, ready for any impression to be made on them by objects brought within the range of vision. For these there is a shelf in the lower part of the stereoscope; just above it is a door for the full admission of light; and on it are placed the drawings or daguerreotypes to be used (fig. 3). These are always double; one being a representation of the object at the angle at which the *left* eye sees it, the other being a representation of the object at the angle at which the *right* eye sees it. Of these we give three different examples (figs. 4, 5, 6,) any two of which if placed in a stereoscope, will present to view one figure. Accordingly they are so arranged that the two representations fall on the corresponding parts of the two retinæ, in exactly the same manner as the two images formed by the solid object itself would have done; and hence the mind perceives, not a single representation of the object, nor a confused union of the two, but a body projecting in relief—the exact counterpart of that from which the drawings were made. In fig. 7, the principle of the stereoscope is shown: the two lenses are exhibited through which the eyes look at the two representations, as well as the converging of the optical axis.

Fig. 3.

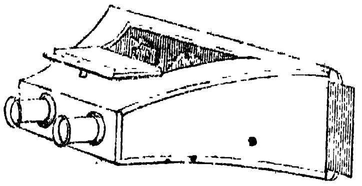


Fig. 4.

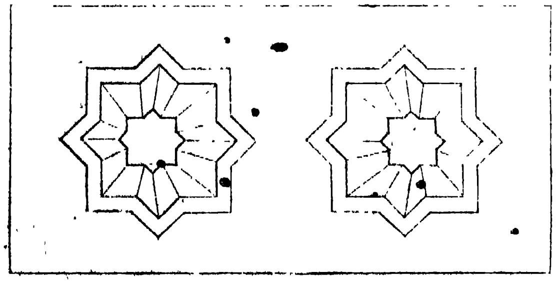


Fig. 5.

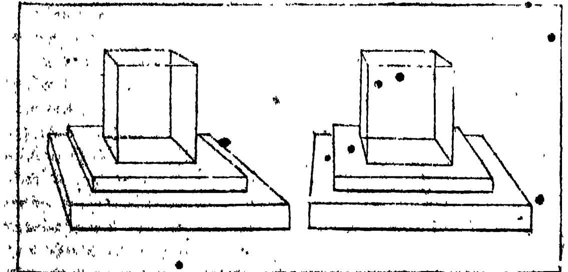
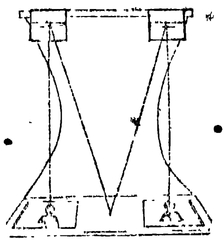


Fig. 7.



When *similar* images, differing to a certain extent in magnitude, are presented by means of the stereoscope to corresponding parts of the two retinæ, a single object, intermediate in size between the two monocular or single-eyed pictures is given. Were it not for this, objects would be seen single only when the optic axes converge directly forwards; that is to say, when the object is equally distant from the two eyes, for it is only then that the images on the retinæ can be of equal size, the size of the image being dependent on *the angle* under which the object is seen, and this being less as the object is more distant. As our conviction, then, of the solidity and projection in relief of bodies depends on a *different perspective* image of each of them being presented to each retina, and as this can take place only when the axes of the eyes are made *to converge to them*, it follows that when objects are at such a distance that in regarding them the *optic axes are parallel*, their images on the choroid will be exactly similar, and the idea conveyed to the mind will be the same as if they were seen with one eye only. Hence, when two perfectly *similar* pictures of an object are viewed in the stereoscope, although they coalesce, they appear but as painted on a flat surface.

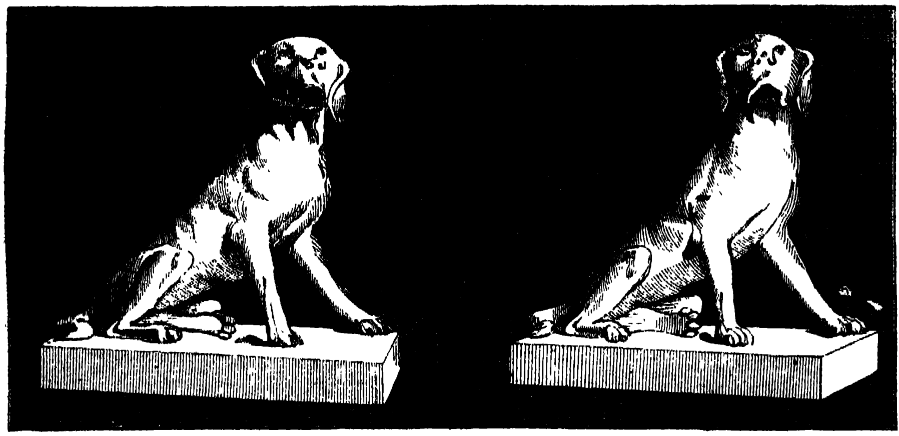
Acquainted with these facts, we can easily understand why the artist is unable to give a faithful representation of any near solid object, that is, to produce a painting that shall not be readily distinguished by the mind from the object itself. When the painting and the object are seen with both eyes, there is a great difference in the two instances. In the painting *two similar* pictures are projected on the choroid, but in that of the solid objects the pictures are *dissimilar*; there is, therefore, an essential difference between the impressions on the organ of sensation in the two cases, and, consequently, between the perceptions performed by the mind. The painting cannot, therefore, be confounded with the reality; but when the stereoscope combines the two *dissimilar* images, there is the sensation which gives rise to the perception by the mind of perfect solidity.

We have only space to refer to one other interesting question, which is thus stated and answered by Mr. Wheatstone.—

"How happens it, then, it may be asked, that persons who see with only one eye form correct notions of solid objects, and never mistake them for pictures? And how happens it, also, that a person having the perfect use of both eyes, perceives no difference in the objects around him when he shuts one of them? To explain these apparent difficulties it must be kept in mind, that although the simultaneous vision of two dissimilar pictures suggests the relief of objects in the most vivid manner, yet there are other signs which suggest the same ideas to the mind, which, though more ambiguous than the former, become less liable to lead the judgment astray in proportion to the extent of our previous experience.

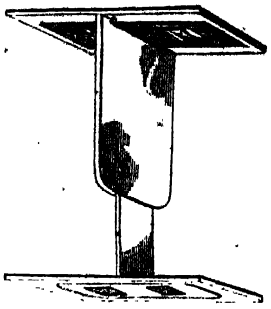
"The vividness of relief arising from the projection of two dissimilar pictures, one on each retina, becomes less and less as the object is seen at a greater distance before the eyes, and entirely ceases when it is so distant that the optic axes are parallel while regarding it. We see with both eyes all objects beyond this distance precisely as we see near objects with a single eye, for the pictures on the two retinæ are then exactly similar, and the mind appreciates no difference whether two identical pictures fall on corresponding parts of the two retinæ, or whether one eye is impressed with only one of those portions. A person deprived of the sight of one eye sees, therefore, all external objects, near and remote, as a person with both eyes sees remote objects only; but that vivid effect arising from the binocular vision of near objects is not perceived by the former; to supply this deficiency he has recourse unconsciously to other means of acquiring more accurate information. The motion of the head is the principal means he employs. That the required knowledge may be thus obtained will be evident from the following considerations. The mind associates with the idea of a solid object every different projection of it which experience has hitherto afforded; a single projection may be ambiguous, from its being also one of the projections of a picture, or of a different solid object; but when different projections of the same object are successively presented, they cannot all belong to another object, and the form to which they belong is completely characterised. While the object remains fixed, at every movement of the head it is viewed from a different point of the sight, and the position on the retina consequently continually changes.

Fig. 6.



"Every one must be aware how greatly the perspective effect of a picture is enhanced by looking at it with only one eye, especially when a tube is employed to exclude the vision of adjacent objects, whose presence might disturb the illusion. Seen under such circumstances from the proper point of sight, the picture projects the same lines, shades, and colours on the retina, as the more distant scene which it represents would do were it substituted for it. The appearance which would make us certain it is a picture is excluded from the sight, and the imagination has room to be active."

Fig. 8



The illustrations to this article are copied from the instruments and the objects accompanying them, manufactured by Messrs. Watkins and Hill, Charing-cross. They have also constructed a very simple and cheap stereoscope, of which fig. 8 is a diagram.

THE LADIES' DEPARTMENT.

EMBROIDERED BLOTTING CASE.

Materials.—Dark stone-coloured kid leather, or black velvet, with the following colours in Berlin silks. In *ombré* silks, olive-green, blue-green, and yellow-green, pink deepening into scarlet, and also into crimson, and blue. In plain silks, 1 black, 2 very light shades of pink, 6 shades of yellow-green, maize colour, 4 shades of violet, and 4 of yellow (the heart's-ease tint).

The design of this blotting-case consists of a centre bouquet of roses and fuchsias, with four corner pieces, varying from each other, one being a blue convolvulus, another heart's-ease, the third a thistle, and the fourth, ears of corn. Our pages do not, of course, admit of the blotting case being given of the full size.—The sprays are, however, of the dimensions to be actually worked, care being taken to place the centre one exactly in the middle, and the others at the corners, allowing a margin of an inch for the border, all round. The sides only of the blotting case are embroidered.

For the manner of preparing and marking the work, we refer our readers to the instructions already given in embroidery; but a brief description of the manner of working these flowers may still be acceptable.

The Centre Group.—The rose and buds are worked in crimson *ombré* silk, with the addition of the pinks in the lightest petals of the flower. The stitch used is the ordinary embroidery stitch, and the engraving represents accurately the direction it should take in every part. It will be observed that the centre sepal of the calyx of each rosebud, as well as the corolla, is worked in stitches which take nearly a perpendicular direction, whilst the *outer* sepals are done in the contrary way. This is important; as it gives an appearance of roundness to the buds which embroidery on a flat surface could not otherwise present. A line of half-polka stitch, in the darkest shade, will also be observed to mark the division in the full-blown flower. The foliage of this group is entirely in the yellow-greens; the lower part has each leaf of one single shade, with the veinings in a darker, the veinings of the darkest leaf being in black silk. It is a rule in embroidery, (as in nature itself,) that where several leaves are on a spray or stem, the lower ones are the darkest, and each one is of a lighter tint, till the one at the point is in the most delicate shade. This must be particularly observed in working the rose-leaves. The dark leaves are at the lowest part of the bouquet, and in the centre, whilst those on each side become gradually lighter. The *ombré* silk is used for the leaves of the right hand rosebud. The thorns are done in the very lightest green, and are formed by a single short stitch. All the very small leaves are of a light shade, but should not be worked in the same one. The reason of this is obvious; the small leaves not having arrived at maturity, have not yet acquired the depth of tint of the full-grown. The foliage of the fuchsias is done in the blue-green *ombré* silk; the stem, as in that of the rose, being darkest at the base. The flowers are in the scarlet *ombré*, the divisions between the petals marked by a dark thread. The stamens are in maize silk, in half-polka stitch, each finished with a French knot.

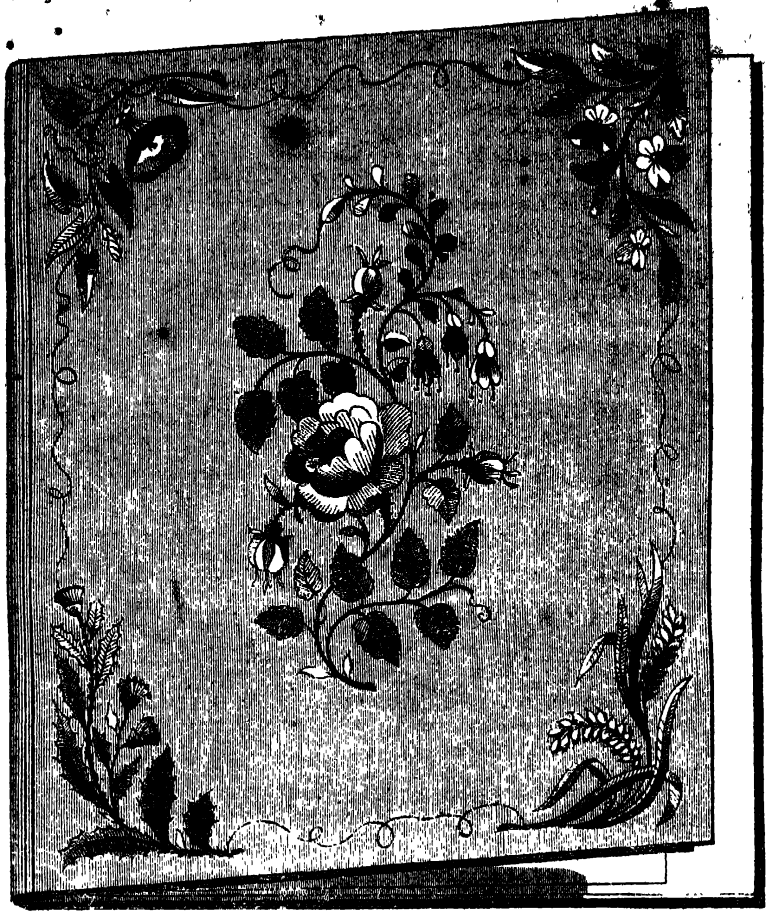
The Thistle Spray.—Each leaf in one shade of the yellow-green, the largest in the darkest, veined with black; the others in pairs, veined with silk one shade darker. The stem *ombré*, dark at the base, and very light where the flower joins on. The flowers should be worked in a succession of lines in half-polka, each terminated by a French knot. For these use the shades of lilac. The calyx in very light green. The prickles are done in very short stitches with olive-green.

The Ears of Corn.—The lower ear entirely, with its stem in light maize colour; the other in ombré olive, with the beard in maize. Some of the leaves in olive, and some in blue-green.

The Spray of Convolvulus.—The foliage entirely in blue-green ombré. In working the leaves great care must be taken to keep the edges perfectly smooth. The convolutions of the bud are represented by lines of half-polka stitch, crossing the long-embroidery stitches in which it is worked. The inner part of the cup of the flower is worked in the faintest pink, fading into white, and is further marked by a line of black, dividing it from the darkest part whilst it blends with the lighter.

The Heart's-ease.—For the foliage use *ombré* yellow-green; for the flowers and buds the shades of yellow and lilac. The green should be in short shades, and the observations we made on the manner of using them for the embroidered note-case (Illustrated Exhibitor, page 16), apply equally here, both to this group and the last. The flowers are of that kind of which the superior petals are purple and the others yellow; they are worked in the usual way.

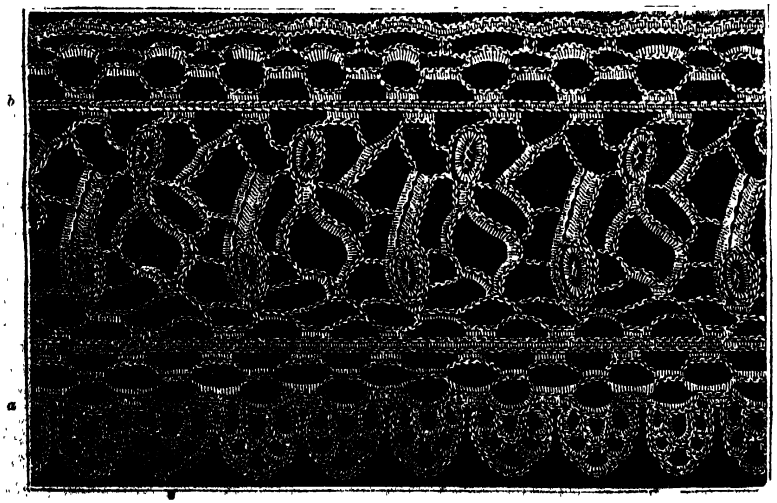
The instructions given for arranging the light and dark leaves, stems, &c., in the bunch of roses, apply equally to all other foliage not worked in *ombré* silks. Let us add that a specimen of the natural flower, placed before the artist who is embroidering in colours, is at all times a most valuable aid in working. What guide so good and true as Nature herself!



The blotting-case should be made up at an ornamental book-binder's, and fitted with white watered silk and gold letters.

CROCHET POINT LACE.

Materials.—Crochet Cotton, No. 20, and Embroidery Cotton, No. 70, Crochet-hook, No. 24, and a common sewing needle.



This style of crochet, of which a great deal is done in Ireland, is a very fair imitation of Guipure lace; not, of course, possessing the intrinsic value of that beautiful and costly fabric, but, nevertheless, being a very pretty addition to the toilet; and as such, we hope, the design will be acceptable to some of our friends to whom crochet is more familiar than point lace work.

The piece before us is done in two parts, which are afterwards joined; the lines for commencing them being the chains marked *a* and *b*. At line *a* the whole edge is done, and two open rows within the line; at *b* the outer part is done, and one line within, whilst the whole intermediate space is one continuous piece of work, connecting the two sides together. The raised parts are done with the embroidery cotton and a sewing needle.

A. Make a chain of any length required, provided the number of stitches can be divided by 31, and leave five or six over for the end. On this chain work a row of s.c.

1st row of the edge, working on this s.c. row. × 5 s.c., 15 ch., miss 9, × repeat. End every row with a few s.c.

2nd: Begin with two or three s.c., and a few chain, × 7 s.c. under loop, 10 ch., × repeat.

3rd: S.c. on the s.c. at the beginning, and under the few chain, × 10 ch., 9 s.c. under chain, × repeat.

4th: S.c. on every s.c., and 2 s.c. under every loop.

5th (to set the vandykes): × 5 s.c. on the 5 centre of the 9 s.c., 9 ch., miss 4, s.c. under 5th, 9 ch., miss 5, s.c. under 6th, 9 ch., miss 4, × repeat.

6th: 3 s.c. on the centre of 5, work under the first and second loops, in s.c., so as to completely cover them, and do half the third in the same way. Turn the work on the wrong side; 8 ch., s.c. at the point of the centre loop, 8 ch., s.c. at the point of the first. Turn on the right side, and s.c. under the [illegible] loop of 8 ch., and under half the next. Turn the work on the wrong side, 8 ch., s.c. on the centre of the finished loop of 8; turn the work on the right side, s.c. under the last loop, and on the two remaining halves. One point is now done. Repeat.

Now, on the original chain do a row thus: × 5 s.c., 17 ch., miss 10, 5 s.c., 17 ch., miss 11, ×.

2nd: × 7 s.c. under a chain, 9 ch., × repeat.

This piece is now ready for joining, lay it aside and begin *b*, making a chain divisible by 28, with a few over. Work on it one row of s.c.

2nd (worked on the chain): × 5 s.c. 17 ch., miss 9, × repeat.

3rd · × 8 s.c. under loop, 10 ch., × repeat.

4th · × 8 s.c. under loop, 8 ch., × repeat.

5th: × 2 d.c. under loop, 14 ch., × repeat.

6th: S.c. on every stitch.

This is the outer row. Now work on the s.c. row, after the chain.—× 4 s.c., 17 ch., miss 9, 5 s.c., 15 ch., miss 10, × repeat.

The two strips being thus done, the centre work, which connects them, is the next part of the process. 4 s.c. on the four first stitches of the last row, and 3 more on the first three of 17 ch.; 20 ch., s.c. under the opposite loop of the piece *a*; turn 20 s.c. under the 20 ch.;—this will not cover it entirely; × 11 ch., s.c. under the loop you began from; turn 6 s.c. under the 11 ch.; 11 ch.; miss 12 of the 20 s.c., 4 s.c. on the next 4. 13 ch., s.c. under the next loop on the *a* side; turn 8 s.c. under the chain of 13; 11 ch., 12 s.c., under the 6 s.c. and the adjoining loop of 11; 6 s.c. under the loop of 17 ch. (*b* side.) Now begin the thick part, on which the satin stitch is afterwards done, working direct from *b* line to *a*, and catching up the various parts as you proceed. Turn 12 ch., 7 s.c. under 11 ch., 8 s.c. on 8 s.c.—2 s.c. under loop. Turn s.c. back on the 15, and 8 more under the chain of 12. Turn s.c. back on all these—2 s.c. under loop at the end. Turn * s.c. back on all. 9 ch., s.c. under the next loop on the *b* side. Turn 7 s.c. under 9 ch., 12 ch., 7 s.c. on 7 near the end of the thick part on the line of s.c. marked *, leaving the last three stitches near the loop. 9 ch., s.c. under the next loop on the *a* side. Turn 7 s.c. under chain of 9; 8 ch. s.c. under chain of 12, and on 7 s.c. to the loop at *b*. S.c. under the loop. Turn 8 s.c. on last 8. Turn 8 s.c. on last; s.c. under the same loop as before. Turn 8 s.c. on the last 8, and five more; 13 ch., 4 s.c. under 4 last of 8 ch., s.c. under loop at *a*, 20 s.c. (on the 4 s.c., under the 13 ch., and on 3 last of 5 s.c. × repeat between the crosses throughout the length of the lace.

For the Satin-stitch. With a double needleful of embroidery thread, trace round the part to be worked, on the right side; just catching the thread in the crochet here and there. Go round and round this until there is a thickness of at least 30 threads, over which work in close button-hole stitch. It is not necessary to take the needle through the crochet in doing the button-hole, but only under the thickness of threads.

Two pieces of raised work occur in every repetition of the centre—one being near each edge.

INSTRUCTIONS IN FRIVOLITE.

Tatting, or *frivolité* (as the French term it), is one of the simplest kinds of needlework; and, as requiring but little eyesight, and being, moreover, very strong and durable, it has considerable claims to the favourable attention of the accomplished *femmes d'aiguilles.*

For some years it was quite out of date, and we owe its revival to some very beautiful specimens of the work sent to the last French Exposition. From that time it became a fashionable employment both in France and England, under the appropriate name of *frivolité*; and the Irish schools, the pupils of which institutions greatly excel in this work, had some very delicate pieces of *frivolité* in our own Exhibition. Our readers will probably remember that we drew particular attention to them in our notices of the Irish work, accompanying our observations by engravings of several of the articles. It now, therefore, only remains to us to give our readers the very simple instructions requisite for doing this pretty work, before furnishing them with receipts for novel designs in it.

The implements used in tatting are a shuttle and a pearling-pin. The former has hitherto been made of bone or ivory; but this being too clumsy for the delicate work now fashionable, a steel shuttle has been manufactured at our suggestion, by Messrs. Boulton and Son, of Redditch, which is far better adapted to all the *fine* kinds of work. The pearling-pin is a gilt pin, attached by a chain to a ring which passes over the thumb. A sewing needle is also sometimes used in forming the patterns.

STITCHES.—Only two stitches are used in tatting—the French and the English; and these are generally made alternately, and thus united are termed a *double* stitch. The shuttle being filled with cotton, is held tightly between the thumb and first and second fingers of the right hand, about three-quarters of a yard of cotton being unwound. Take up the piece of cotton a few inches from the end, between the thumb and forefinger of the left hand, and extending the other fingers, pass the thread round them in a circle, holding it still with the thumb and forefinger.

French Stitch. Holding the hands as already described, throw a loop of the thread which goes from the left hand to the shuttle in the right, over the knuckles of the first and second fingers of the former; slip the shuttle *upwards*, under the loop round the fingers, and draw it out to the right with a jerk, when a loop is formed on the thread round the fingers. Hold the shuttle steadily out to the right, keeping the thread quite tight, while you slip the loop just made up to the finger and thumb, and hold it there.

English Stitch. Instead of throwing the thread over the knuckles, let a loop of it drop down in front of the left hand, and pass the shuttle *downwards* under the thread which is stretched round the fingers. Draw out the shuttle as before, and pull the loop up.

These two stitches are generally done in rotation. When the given number is completed, the thread is drawn up, either quite tight, or nearly so, and a *loop* of tatting is then done.

The PEARLING-PIN is used to make the little spots on the edge of the loops, termed picots. The pin is held between the finger and thumb of the left hand, and parallel with the worked stitches: when a picot is to be made, the thread which surrounds the fingers is passed over the pin, then so many stitches more are done, and again it is passed over. The pin is withdrawn just before the loop is pulled up, and, being suspended by the chain, hangs down from the thumb.

TO JOIN TWO LOOPS.—A picot must be made on the first, where the join is to be, and when the worker comes to the corresponding part of the *second*, the thread round the fingers must be drawn through the loop of the picot sufficiently to allow the shuttle to pass through. The thread must then again be stretched over the fingers, and the join is complete.

Loops joined in this way are much stronger than when they are unconnected.

We must beg our friends to refer to these instructions, when designs in *frivolité* are given, should they happen to be unacquainted with the art.

THE NEGRO CAREY.

JOHN THOMAS CAREY, an American negro, was for a long number of years the faithful and attached servant of the founder of the republic of the United States. Born in the year 1729, at Mount Vernon, the property of Washington, he had been reared by the mother of the illustrious patriot, that woman of admirable simplicity, who replied to the praises which Lafayette was lavishing upon her son, when he so nobly laid aside the honours of the supreme power with which his fellow citizens had invested him, "I am not surprised," said his mother, "at what George has done, for he has always been *a very good boy.*" Every one knows that Washington of his own accord liberated the blacks on his property before calling for the emancipation of the slaves by the American legislature. Carey, after receiving his liberty on the day on which the independence of the United States was proclaimed, voluntarily attached himself to the person of Washington, and continued by his side throughout the whole of the war of independence, and subsequently up to the death of the American hero. After attaining the venerable age of one hundred and fourteen years, he died in 1843, and was buried at Greenleaf's Point, near Washington.

Carey was of middle size, and possessed an agreeable polish of manner, which bore no marks of his former condition. Lafayette spoke of him as being a man of the most upright disposition, and remarkable for a genuine simplicity, which, without in any way marring the true nobleness of his character, accorded so well with his humble condition in life.

The portrait of this excellent man accompanied that of Washington, on foot, which was published in 1788. Carey is seen in the back ground, holding the reins of the general's horse, while his master, who has the act of independence in his hand, is meditating on the plan of a campaign. A similar-sized portrait of Lafayette, also on foot, was published at the same time.

NUREMBERG.

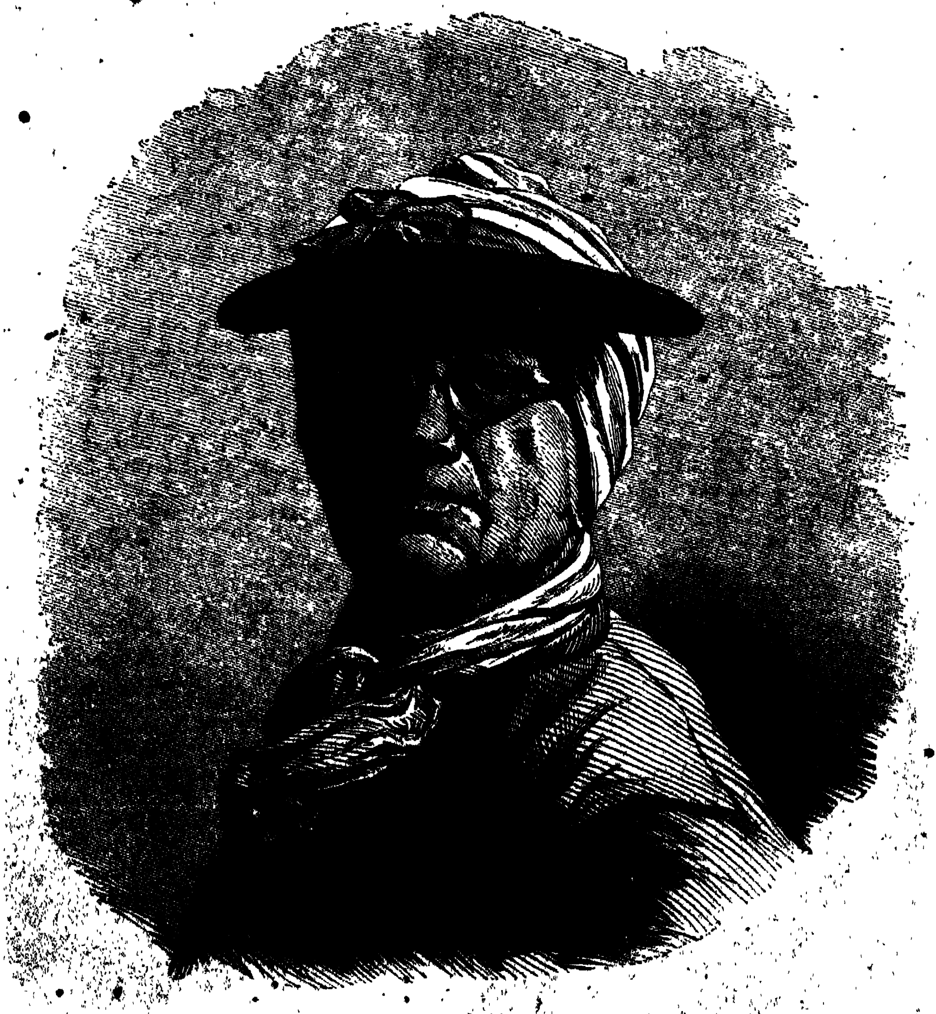
NUREMBERG (or, as it is called in Germany, NÜRENBERG), next to Munich, the capital, is the most populous city in Bavaria, and was formerly one of the most flourishing members of the Hanseatic League. This fine old city, which so completely represents the architecture of the fifteenth century, stands in a sandy but fertile plain, at an elevation of about one thousand feet above the level of the sea. It is divided by the river Pregnitz into two unequal parts, the smaller and northern of which is called the Sebald-side, and the southern and larger the Lawrence-side,—each deriving its name from its principal church. The river forms three islands within the walls, which are connected with each other and the city by seven stone and nine wooden bridges, and one suspension bridge which was begun in 1821. Though Nuremberg cannot properly be considered a fortified town, owing to the neglected state of its defences, it is surrounded by feudal walls and watch-towers, and these are enclosed by a ditch one hundred feet wide, and fifty feet deep, lined throughout with masonry. Its arched gates are flanked by four massive cylindrical towers, no longer of use as fortifications, but picturesque in a high degree, and serving to complete the coronet of antique towers which encircle the city, as seen from a distance. On entering its old-fashioned and irregular streets for the first time, the stranger might fancy himself carried back to a distant century, as he gazes at its quaint gable-faced houses, and other remains of mediæval architecture which surround him on every side. Its churches and other public buildings are singularly perfect, having escaped unharmed the storm of war, sieges, and even of the Reformation, whose doctrines its inhabitants were amongst the first to adopt. Its private buildings, including the palace-like mansions of its patrician citizens and merchant nobles, are equally well preserved, and many of them are still inhabited by the families whose ancestors originally built them. Though constructed with narrow but highly ornamented fronts, and acutely-pointed gables, they are often of a large size, inclosing two or three courts, and extending back from one street to another. The circuit within the walls is about three miles and a half; a considerable extent of which space, however, is taken up in squares, and markets, and gardens. One of the most remarkable ancient buildings in this old mediæval town is the fortress called the *Reichfeste*, or imperial castle, which, there is reason to believe, was erected in the tenth century under the Emperor Conrad I., and the care of which was confided in the middle ages to the burggraves of Nuremberg, the ancestors of the house of Hohenzollern. This old castle stands on the most elevated position within the town, and the exterior having received no modern additions, is an excellent specimen of mediæval architecture. A portion of the fortress is fitted up for the king of Bavaria, when he visits Nuremberg, and contains a picture gallery, the paintings in which, however, though numerous, are generally of the most ordinary merit, with the exception of one by Albert Durer. The *Rathhaus*, or town-hall, in the Italian style, is one of the finest in Germany; it is 275 feet wide, and was chiefly built in 1619, but includes the ancient town-hall, dating from 1340. In the latter are the great hall and the council chamber, the walls of the former apartment being ornamented by several oil paintings by Albert Durer, Hirschvogel, and others. Almost all the churches—eight Lutheran, one Calvinist, and one Roman Catholic—are highly deserving of notice for their architecture and the works of art which they contain. That of St. Sebald, which is a fine Gothic edifice, with an elegant choir, built in 1837, has numerous sculptures by Adam Kraft and Veit Stoss, many old paintings and stained glass windows, and the remarkable shrine of the patron saint of the church. This shrine, which still stands in the centre of the church, though the latter is devoted to the Lutheran service, is the masterpiece of the celebrated Peter Vischer, who, with his five sons, was employed on it for thirteen years. "It is a miniature Gothic chapel," says a late writer, whose minute description we borrow, "entirely of bronze, consisting of a rich fretwork canopy, supported on pillars, beneath which the relics of the saint repose in an oaken chest, encased with silver plates. The workmanship is most elaborate. The figures of the twelve apostles occupy the niches around the shrine, and are truly first-rate works of art. Above them are twelve smaller figures of fathers of the Church; while about seventy fanciful representations of cupids, mermen, animals, &c., distributed among flowers and foliage, are scattered over the other parts. The miracles of the saint are the subjects of the bas-reliefs under the coffin. In a niche below, at one end, is an admirable statue of the artist himself, in a mason's dress, and at an opposite end is a figure, equally excellent, of St. Sebald." The church of St. Lawrence, a fine Gothic edifice founded in 1274, is the largest in the town, and is extremely rich in old German paintings. This very handsome building has a tapering spire of Gothic open-work, sixty-four feet in height, executed by Adam Kraft, with a minuteness more commonly bestowed upon ivory than on stone. The church of St. Giles, which was built in the Italian style at the beginning of the eighteenth century, has a fine altar-piece by Vandyck, several very handsome bas-reliefs, and other rich architectural decorations. Near this church is the gymnasium, in front of which the city erected, in 1826, the statue of Melancthon, by whom the institution was founded. The church of St. Clara, which was built in the twelfth century, contains the city library of twenty thousand volumes, with a collection of the works of the reformer just mentioned, and of other controversial works written at the time of the Reformation. The church of the Teutonic Knights, begun in 1784, and the Roman Catholic church of Notre Dame, of which we present our readers with an illustration, are, with those already mentioned, the principal ecclesiastical buildings of Nuremberg. Notre Dame was designed by, and built under the superintendence of, the illustrious brothers Schonhafer, in the middle of the fourteenth century, and during the reign of the emperor Charles IV. It has the square form of the first churches which the Greeks built after the model of the pagan temples. It was not, however, until more than a century after its erection, that the pointed arch was adopted; nor was it till about the same period that the very handsome tower in front of the church was so advantageously added to the building. This exquisite improvement was the work of Adam Kraft, who executed its decorations with the same delicate minuteness which he had displayed on the Gothic spire of the church of St. Lawrence. The same artists likewise adorned the interior of Notre Dame with several exquisite reliefs of the most perfect finish. The church of Notre Dame is thus partly Greek and partly Gothic in its construction, and is hardly surpassed in its decorations by any of the other buildings of a city which is peculiarly rich in the excellence of its ecclesiastical architecture.

Besides the structures now mentioned, Nuremberg has several others not undeserving of notice. Amongst these may be classed its fountains, especially that one called the *Schoner Brunnen* (beauti[illegible] fountain), in the great market-place; and a very handsome Gothic obelisk of openwork, adorned with statues of various historical characters. Besides its gymnasium, already mentioned, Nuremberg has a royal and other high schools, several Latin and numerous inferior schools, a polytechnic institution, a high commercial academy, societies of national industry and medical and natural science, together with an agricultural union, and collections of every description in the arts and sciences. Though considerably declined, it still ranks as one of the chief commercial cities of Bavaria. Its trade consists principally of hardware, turnery, looking-glasses, paper, parchment, iron articles, wooden clocks, musical instruments, engravings, painters' colours and pencils; glass, porcelain, watches, calicoes, carpets, and toys. The trade in these last-mentioned articles, which are chiefly made by the country people in the hilly and wooded district between Franconia and Thuringia, is very extensive and important. Nuremberg has been the birth-place of many distinguished men, among others, the famous painter, Albert Durer, who was born here in 1471; Melchior Pfinzing and Hans Sach, the poets; and Martin Behem, who made the first terrestrial globe. Among the inventions said to have been made here are watches (first called Nuremberg eggs) by Peter Hele; the famous wire-drawing machine by Rudolph; gunlocks by an unknown inventor; the pedal by Heinric Traxdorf; the air-gun by Lobzinger; the clarionet by Denner; and brass by Erasmus Ebner. Owing partly to these inventions, but more to the freedom and industry of its inhabitants, Nuremberg early rose to great eminence as a manufacturing and commercial town. It was, in fact, the continental Birmingham of the middle ages, during a period of which it is said to have had seventy thousand inhabitants. Its name is first mentioned in history in 1050, and it obtained its first charter in 1219 as a free city of the Circle of Franconia, celebrated for its industry and commerce, and for its great services to the emperor and empire; it retained its freedom through all the changes made in Germany in 1803: two years later, however, it was annexed to Bavaria by Napoleon at the peace of Presburg, in 1805. Its present population numbers about 45,000, of whom about 3,500 are Roman Catholics, and the great majority of the rest Lutherans.

CHURCH OF NOTRE DAME, NUREMBERG.

JEAN BAPTISTE CHARDIN.

Rome, Florence, and Venice had long been renowned for the triumphs of art before France had even shown that one of her people was capable of anything better than wood carving and engraving, or servile and weak imitations of the great Italian masters. Men were beginning to believe that love for art was not racy of French soil, that her men were too gay and frivolous to display either force of conception or depth of passion; and that whatever excellence they might attain in architecture or manufacturing industry, they had none of the grasp of thought and fire of imagination which make a Titian or a Raphael. The ascension of Francis I. to the throne was the beginning of a new era. This monarch was not more renowned for his chivalrous valour in war than his attention to the arts of peace.



JEAN BAPTISTE CHARDIN.

His court was the resort of the wittiest, the most learned, and the bravest men in Europe. Leonardo da Vinci, one of the first artists of the day, was the intimate friend and constant companion of the king, and his influence was soon perceptible in the efforts of the French artists to achieve something, the originality of which should take from them the reproach of slavish copying, and stop at least some portion of the expenditure yearly made by their own nobility in the purchase of the works of the great masters of foreign countries. Then it was that the French proved their title to be reckoned amongst the faithful disciples of the ancient worshippers of the beautiful in nature. Their progress from this time was rapid, and merely to mention the names of Vouet, Gaspar and Nicholas Poussin, Le Seuer, and Le Brun, will be sufficient to recall a hundred of their triumphs to the reader's mind.

But art in France seems to have had for many years an abhorrence of low life, of aught that was not allied to rank or fashion, the romance of ancient mythology, and the glories of natural scenery. The homely simplicity of rustic life, the toils and struggles of the poor and lowly were deemed unworthy the illustration of a cunning hand. Watteau has handed down to us striking representations of gay pic-nics in lordly forests, of capricious belles and handsome cavaliers promenading by moonlight, and titled shepherds and shepherdesses dancing minuets under the wide-spreading foliage on cool summer evenings, but Chardin has placed before us the better, because truer and deeper, traits of life and character which mark "the short and simple annals of the poor." Both were men of the highest genius, but differing so widely in object and mode of action, that it would almost seem impossible that the same age could have produced. The brilliant grace of Watteau has often eclipsed the soberer but sweeter light of Chardin's pieces. Dazzled by the winning flatteries of the great, the former could never worship at the shrine of virtue in humble life, and yet, where can better materials be found for the painter's art than in the piety, simplicity, and domestic happiness of the "common herd!"

But for Chardin we should know nothing of the French people as they were in the reign of Louis XV.—calm, serious, honourable, and full of the spirit of religion—presenting a striking contrast to the frivolous brilliancy of the court, the faults and follies of which have been but too faithfully transmitted to us. Chardin was himself the son of an upholsterer, and being brought up from his childhood in the midst of the working classes, the success and opulence of his after life could never efface his sympathy with their sufferings and virtues. His paintings are in truth a history of the people, and not that of profligate court and degenerate nobility.

Like many other artists', the names of his paintings indicate his style—the *Goodwife*, the *Governess*, the *Benedicite*, the *Schoolmistress*, the *Soap-bubbles*, the *Game of Goose*, the *Study of Design*, the *Washerwoman*, &c.: all these tell of faith, and hope, and charity—of the mild virtues that adorn, and the high qualities that dignify, the struggles of unknown merit. What Hood and Dickens and Wilkie have done for England, Chardin did for France. He impressed the public with the idea that the virtues, like plants, grow from below upwards, and that the goodness (and far be it from our thoughts to depreciate its value or extent) found amongst the upper ranks of society, the titled and luxurious favourites of fortune, is from the very nature of their position and pursuits but a dim reflex of the purer light which shines so steadily through good and ill beneath.

Chardin was a scrupulous imitator of nature, and all his pieces are distinguished, not less by the rude vigour of their execution in the more prominent parts than the great delicacy of the details; and perhaps no French artist has ever displayed so exact an appreciation of the effects of light and shade.

The nature of the subjects which he has in every case chosen is a striking proof of his enthusiastic love of art solely for art's sake. Not one of them is drawn from the associations of gaiety and luxurious ease by which his great wealth and high talents had surrounded him. His imagination was ever recurring to the scenes amidst which his early life had been spent. By his father—who, as we have already said, was an upholsterer—he was placed in the studio of Pierre Jacques Cazes, an historical painter, that he might learn the elements of design, in order to qualify himself for the tasteful decoration of apartments in private houses. A marriage with an heiress at the age of twenty-one placed him above the necessity of labour, and he thenceforth painted merely for amusement, and without any idea of distinguishing himself in it. An accident for the first time made him acquainted with his own talents. It was the custom for the artists who did not belong to the Academy to exhibit their works on Corpus-Christi Day in the open air in the Place Dauphine. Amongst them Chardin, on one occasion, placed some of his. The members were struck by the wonderful accuracy and truthfulness of one of them, representing a ray-fish with the body opened, and, inquiring for the owner, immediately proposed admitting him to the Academy. This painting still remains in the gallery of the Louvre. From the period of his admission, in September, 1728, until his death, in December, 1779, he exhibited more than a hundred *tableaux de genre*, animals, "dead nature," and sometimes landscapes. His paintings were eagerly sought after by the amateurs of the day, and a great number were bought for the courts of Sweden and Russia. He was elected a councillor of the Academy in 1743, and treasurer in 1754. He at this time lived chiefly at Rouen, and was chosen a member of the Academy of Science, Arts, and Belles Lettres of that town. We are informed by Diderot, in a letter written in 1769, that to him also was assigned the task of assigning its place to each painting at the Expositions. The same writer also calls him "*un homme d'esprit*"—a man of intellect—and states that none of his contemporaries could speak on the fine arts with so much force and precision. His critiques on painting exercised a powerful influence on the artists of the day, and the effects of them may be traced in many of the works published at the time. He took every opportunity of impressing his pupils with the idea "that the hand, the brush, and the colours, were only the tools of painting; that even rules were but the means; and that what really constituted an artist was genius and truthfulness. The want of the former could be in some sort supplied by tact and talent, but nothing could compensate for the absence of the latter."

STATISTICS OF THE WOOLLEN MANUFACTURE OF GREAT BRITAIN.

Unlike the cotton and silk manufactures, a large proportion of the raw material used in the woollen manufacture is the produce of our own country. Of the actual quantity of wool annually produced in this country we have no data of an officially correct character. In 1820, Mr. Luccock estimated the production of English wool at 393,236 packs, of 240 lbs. each, or 94,376,640 lbs. In 1828, Mr. Hubbard estimated the produce at 463,169 packs, or 111,160,560 lbs.; in 1845, Mr. Porter estimated it at 607,187 packs, or 145,724,880 lbs. Taking it in round numbers at 150,000,000 lbs., we shall probably be very near the mark if we assign that quantity to be the annual produce at the present time. The whole of this produce, however, is not consumed at home, for in 1850 there were exported 12,002,773 lbs.; and in 1851, 8,517,500 lbs., principally to Belgium and France. As however British wool is not sufficiently fine for the better class of woollen cloth goods manufactured, we import considerable quantities of this raw material from foreign countries and from some of our colonial possessions. There has been a remarkable alteration in the quantities of wool imported from different places abroad even during the last fifteen years, without going farther back. This will be evident if we contrast the imports of the years 1833 and 1849, the date of the last official classified account. In 1833, the quantities imported from the undermentioned countries were as follows:—Spain, 3,339,150 lbs.; Germany, 25,870,106 lbs.; other European countries, 5,056,380 lbs.; South America, 228,832 lbs.; East Indies, 3,721 lbs.; Cape of Good Hope, 93,325 lbs.; Australia, 3,516,869 lbs.; other parts, 442,704 lbs.: total, 38,046,087 lbs. In 1849, Spain, 127,659 lbs.; Germany, 12,750,011 lbs.; other European countries, 11,432,354 lbs.; South America, 6,014,525 lbs.; East Indies, 4,182,853 lbs.; Cape of Good Hope, 5,377,495 lbs.; Australia, 35,879,171 lbs.; other parts, 1,004,679 lbs.: total, 76,768,647 lbs. It is gratifying to see the great development of our Indian, Australian, and African possessions in the production of this valuable raw material. In 1788, the number of sheep in Australia was 29; in 1800, 6,124; and in 1848 (December 31), 14,943,903. In 1851, the importation of wool was as follows:—British possessions out of Europe, 51,993,463 lbs.; other parts, 29,070,216; Alpaca and Llama wool, 2,013,202: total, 83,076,881 lbs. Of this there were re-exported, 13,729,938 lbs., leaving a surplus of 69,346,893 lbs. of foreign wool for home use, which, added to the balance of British wool (by deducting 8,500,000 from 150,000,000), 141,500,000, gives a grand total of nearly 211,000,000 lbs. for the use of our manufactures.

In the spinning of this wool into yarn, and weaving the yarn into cloth, blankets, &c., there were employed in 1851 in 1,497 factories 74,443 people (44,765 males, and 29,678 females), of whom 4,226 were boys, and 2,868 girls under 13 years of age, 11,884 males between 13 and 18 years of age; 26,810 females above 13 years of age, and 28,655 males above 18 years of age.

The number of spindles employed in spinning the wool into yarn was 1,595,278, and the number of power-looms employed in weaving the yarn into cloth, &c., was 9,439; these spindles and power-looms being set in motion by 13,455 horse steam-power, and 8,689 horse water-power.

The distribution of the woollen factories throughout the United Kingdom is as follows:—*England and Wales*—Brecon, 9; Cardigan, 9; Carmarthen, 18; Cheshire, 12; Cornwall, 5; Cumberland, 11; Denbigh, 7; Derby, 2; Devon, 14; Dorset, 3; Glamorgan, 31; Gloucester, 80; Hants, 1; Hereford, 3; Lancashire, 26; Leicester, 6; Lincoln, 1; Merioneth, 16; Middlesex, 1; Monmouth, 9; Montgomery, 54; Oxford, 8; Pembroke, 9; Radnor, 2; Shropshire, 3; Somerset, 31; Surrey, 8; Westmoreland, 8; Wiltshire, 36; Yorkshire, 880; total, 1,30[illegible].

Scotland—Aberdeen, 22; Ayr, 16; Berwick, 5; Clackmannan, 23; Dumfries, 5; Edinburgh, 2; Fife, 2; Forfar, 2; Haddington, 1; Kinross, 2; Kirkcudbright, 4; Lanark, 6; Linlithgow, 1; Moray, 2; Peebles, 4; Perth, 14; Renfrew, [illegible]; Ross, 2; Roxburgh, 21; Selkirk, 14; Stirling, 22; Wigtown, 1; total, 182.

Ireland—Cork, 1; Dublin, 2; King's County, 1; Queen's County, 3; Kilkenny, 1; Waterford 1: total, 9.

The number of people employed in these factories by no means represents the whole number of persons employed in the woollen manufacture; there are many processes incident to this manufacture which are carried on in the cottages of the work-people, and consequently are not mentioned in the above account. In the woollen-cloth manufacture of the West of England about two-thirds of the people work in the factory, and one-third out. The total number of persons employed, inclusive of dyers, scourers, makers of machines, foremen, clerks, &c. &c., may be estimated at upwards of 350,000.

In addition to the woollen factories, properly so called, there are 501 worsted factories, which must be included under our general notice of the manufactures in wool of the United Kingdom. These factories are located as follows: —*England*—Devon, 7; Durham, 4; Essex, 1; Lancashire, 11; Leicester, 2[illegible]; Norfolk, 11; Nottingham, 1; Shropshire, 2; Staffordshire, 1; Surrey, 1; Westmoreland, 8; Worcester, 11; Yorkshire, 418: total, 493.

Scotland—Ayr, 4; Lanark, 1; Renfrew, 1: total, 6.

Ireland—Dublin, 2.

In the spinning and weaving of worsted in these factories there were employed in 1851, 79,737 persons (27,117 males, and 52,620 females), of whom 4,237 were boys, and 5,719 girls under 13 years of age; 7,695 males between 13 and 18 years of age; 46,901 females above 13 years of age; and 15,185 males above 18 years of age. The number of spindles employed in spinning the worsted was 875,830, and the number of power-looms used in weaving 32,617;—these spindles and power-looms being worked by means of 9,890 horse steam-power, and 1,625 horse water-power.

The value of foreign woollen manufactures not made up, imported in 1851, was £698,622; and of articles or manufactures of wool wholly or in part made up, £113,041. Of the former to the value of £53,534 were re-exported; and of the latter to the value of £15,697.

The quantities and value of British manufactured woollen goods exported in 1849 were as follows:—Yarn, 11,773,020 lbs.; cloths of all sorts, 331,800 pieces; napped coatings, duffles, &c., 1,294 pieces; kerseymeres, 32,690 pieces; baizes of all sorts, 21,896 pieces; woollen or worsted stuffs, 2,003,595 pieces; flannel, 2,266,959 yards; blankets and blanketing, 5,708,025 yards; carpets and carpeting, 1,565,745 yards; woollens mixed with cotton, 42,115,401 yards; woollen or worsted stockings, 165,645 dozen pairs; sundry small wares, value £199,761: total value, £7,342,723. The United States of America, the Hanseatic towns, Holland, Italy, the South American States, British North America, China, India, Belgium, Portugal, France, and Australia, are our best customers for woollen goods. From 1718 to 1724, the annual value of British woollens exported was £2,962,881; in 1799, £6,876,939. In 1816, on the close of the war, the exports rose to the large sum of £10,200,927, a point they have never again reached, although the value of the exports in 1851 was £10,040,032. In 1851, there were exported of woollen manufactures, entered by the piece (as cloths, &c.), 2,687,290 pieces; of goods entered by the yard (as flannels, carpets, &c.), 69,253,594 yards; 189,893 dozen pairs of stockings; sundry small wares of the value of £187,802; and 120,081 cwts. of woollen yarn; the total value of which amounted to £9,856,259, a large proportion of the value of the whole exports of the country.

CROWTHER THE BOTANIST.

James Crowther, a porter at Manchester, furnishes one of the most extraordinary instances on record of devotion to science in humble life. He was born at Manchester, and at the age of nine years was employed as errand boy in connexion with one of the factories, like most of the children of the poor in these great seats of industry. He had been sent to school during some short period, and had made such good use of his time that he had learned to read with sufficient ease and correctness to acquire some literary taste; but from his earliest years he exhibited the utmost fondness for natural history, and above all for botany. Manchester and its environs have always numbered amongst its working men a considerable number of amateurs in science, if we may use the expression, and the fields in the neighbourhood are frequented by them for the purpose of collecting specimens.

Crowther made the acquaintance of some of these, and remained upon intimate terms with them during his whole lifetime. Thirty or forty persons belonging to the town, and who were fond of botanising, met every week during spring and summer to exhibit the specimens they had collected, and communicate to each other the result of their observations. Crowther, however, being employed as a porter during the day, could only devote the night to his favourite study. He might often be seen in the fields about day-break, where he continued busily engaged until the approach of the hour of labour compelled him to hasten home. While thus employed, he frequently run great danger of being arrested by gamekeepers, watchers, and others, who could not imagine that a man in his rank of life could be roaming through the fields at such an hour for any purpose but a mischievous one. Upon one occasion he was found botanising upon the property of a Mr. Egerton, and was taken into custody, charged with fishing in his preserves, and was brought up before a magistrate. The proofs appeared sufficiently plain. He was armed with a long pole with a sharp crook and a net at the end. It was in vain that the botanist protested his innocence of the design imputed to him, and explained that his weapon was intended for no other purpose than the pulling up of aquatic plants and dragging them ashore, and he would in all probability have paid for his imprudent devotion to science by being immured in prison, had not Mr. Egerton become convinced of the truth of his story, and given direction to his gamekeepers not to prosecute him nor molest him in his excursions in future. His friends tell many stories of the delight which the discovery of a plant previously unknown to him caused him even in old age. He never seemed in the least degree affected by cold or fatigue. One day he persuaded one of his friends to accompany him to a lake on the banks of which he stated he had seen a rare plant; but on their arrival they found, to Crowther's great chagrin, that the waters had risen so much in consequence of the heavy rains that the object of their search was no longer to be seen. His friend was about to go away dissatisfied, when he heard a plunge, and turning round he found that Crowther had disappeared. In a few minutes he re-appeared and swam ashore carrying the specimen in his mouth.

Crowther's name has not been entirely unknown to fame. Sir J. E. Smith, Dr. Hull, and Larmoletti speak of him in terms of the highest praise, and of the services he had rendered to science by his valuable collection of mosses and lichens. He also devoted considerable attention to entomology, and had in his possession a large collection of insects, which he classified himself with great care: but he was obliged to dispose of them by degrees, in consequence of the pressure of poverty, as he had a wife and a large family. His innate modesty always kept him from seeking either assistance or patronage, and he consequently remained all his life the porter of a warehouse. For a long time he received only sixteen shillings a week of wages, and afterwards twenty shillings, the whole of which he placed in his wife's hands, reserving to himself nothing but the proceeds of any extra jobs he might pick up in the town, which he spent in furthering his botanical pursuits. Age and infirmity having rendered him no longer fit for the duties of his situation, he was obliged to subsist during the latter years of his life upon a pension of three shillings a week allowed him by the Society for the Encouragement of Needy Men of Science. This was all Manchester could do for a philosopher in humble life—the great emporium of commerce which spends thousands without hesitation upon the uncertainties of political agitation. Crowther died in 1847, at the age of seventy-seven years, leaving all his children in a position as humble as his own. When he was dead the world found out that he was a great man, and spent seven guineas in burying him and building a tomb over him, by way of compensating him for the misery and destitution of his old age!

PAINTINGS OF CHARDIN.

In the first engraving we find ourselves in the interior of the modest dwelling of one of the lower classes. It is mid-day, and the young mother is engaged in apportioning their dinner to her children. Leaning upon the table, she dictates to the elder a form of imploring a blessing on their food, and the little girl, with clasped and uplifted hands, seems to repeat the words as they fall from her lips. Let the reader attentively examine the expression of those three faces. Let him observe the careful adjustment of the young mother's cap, the tasteful folding of her handkerchief, the rosette in her shoes, and her long muslin sleeves—the mingled piety and fondness of her looks—and ask himself, must not a feeling heart and observant eye have guided the hand which traced this scene of domestic happiness and purity? The mother is a fine type of the character which happily for mankind, is found amongst thousands of her sex, preserving in her house the sacred traditions and noble instincts of religion, of honour, and of self-respect, without aught of "high life" but its good taste.

ASKING A BLESSING. FROM A PAINTING BY CHARDIN.

The *Washerwoman*, of which we present our readers with an engraving, was one of the first paintings exhibited by Chardin, in 1737, and was purchased for the Collection of the Chevalier de la Roque. It displays great truthfulness both in design and execution. The scene is a room in a cottage, in which a young housewife is washing clothes in a tub, with a coarse apron tied before her to protect her clothes from the water. Her scissors hang on a chair behind her, and beside the tub a child sits blowing soap-bubbles from a tube. In the background a half-opened door shows a servant hanging clothes on a line to dry.

and on the ground a cat is crouching lazily. This is the whole of the painting; but what exquisite skill there is displayed in the distribution of the light and shade, and what grace and simplicity in the air and attitude of the women and the child!

These are the sort of works which inspire the humbler classes with the love of art and the spirit of beauty which should animate and guide it. The truth of illustrations drawn from scenes in their own everyday life they can perceive at once, and here they may with safety criticise. They can detect points of difference between the reality and the representation, and improve their powers of observation by searching for them. And where, as in nearly all Chardin's pictures, the highest lessons of morality are inculcated through the medium of sensuous pleasure, and the good and useful is not lost sight of in seeking for the beautiful, the beneficial effects of the exhibition of good works of art can hardly be overrated. Chardin was happy in belonging to a country, which with all its faults, has ever been celebrated for its efforts to supply the working classes with the means of mental improvement and elevation. Galleries of the finest paintings in the world placed in royal halls are open to all. Parks and gardens, fountains, libraries, are everywhere at the service of the *ouvrier* as well as the *gentilhomme*; and the result is, that the working men of France in manner, bearing, intelligence, and fondness for intellectual and refined pleasures are far superior to our own. This may be a truth painful to hear, but the fault lies with our rulers. While thousands have been spent on statues to profligates, whom the nation is ashamed to own and the world would fain forget, our picture-galleries are few and badly managed, funds are voted for public instruction and amusement in a spirit of short-sighted niggardliness; and this week we hear that the Crystal Palace, the greatest triumph of English art and industry, is likely to be pulled down. We can learn something from our neighbours if we are wise. We cannot teach everybody to be great painters or great authors; but everything should be done to make the mass of the people seek after and admire the works of those who have lived and laboured for truth and beauty and humanity, who have taught, whether with pen or pencil, that to be industrious, moral, earnest, energetic, and high-minded, is to be happy and useful. To accomplish this, all we have to do is to place no restraint in the way of inquiry and self-improvement. The people's desire to elevate itself will do the rest.

THE WASHERWOMAN. FROM A PAINTING BY CHARDIN.

A VISIT TO A SOAP MAKER'S FACTORY.

WHAT IS SOAP? Few of us delay our ablutions to ask or answer this question; nor is it at all necessary that we should—just at that particular moment. But a knowledge of the history and manufacture of this valuable domestic adjunct may nevertheless be of essential service. We may therefore spend a profitable half hour or so in describing what to thousands of persons will possess the charm of novelty—namely, the manufacture of soap. This substance, then, to return to the words at the head of the paragraph, may be described as a saline chemical compound, formed of saponified fatty or oily bodies, which, not being of themselves soluble in water, compose, when intimately mixed with alkaline leys, a homogeneous mass, which is easily soluble in water or alcohol. In other and simpler language, fatty matters, such as tallow and oil, when mixed with soda or potash, produce a compound which will lather and froth in water, and which possesses the property of cleansing linen, &c.

All fatty matters may be converted into saponaceous or soap-like compounds, by union with various metallic oxides; but the manufactured and commercial article Soap is understood to consist of the products of soda or potash acting upon fats, the nature of which determine the various kinds. When subjected to the action of alkaline leys, fatty matters undergo a very remarkable change, being thereby converted into three distinct acids, called stearic, margaric, and oleic. The stearic acid, improperly called stearine, is the solid portion of tallow and various oils, and from it is made the factitious wax candles known as stearine: the margaric, or pearly looking acid, is similar in character to the stearic, and of itself is insoluble in water; and the oleic acid is the thin oily part of the fats, with which is always associated glycerine, or the sweet constitutent of oily bodies. If any of our readers may not altogether understand this somewhat scientific description, it may be stated in simplification, that when subjected to the action of soda or potash, tallow is deprived of its greasy quality. These acids, then, combine and form the compound known as soap.

Our English word is derived from the Latin *sapo*, which, as well as the Greek equivalent, is supposed to come from the low German word *sepe*, a word still retained in many of the German provinces. In the mutations of language this word became changed into the high German *seife*, the *d* having given place to the hard *f*. In the French language our word soap is *savon*; in Dutch, *zeep*; in Italian, *sapone*; in Spanish, *jaborns*; in Portuguese, *sabao*; and in Russian, *malo*.

Various kinds of soaps are in use in the present day. Among them we may mention the yellow or rosin soap, the mottled, the curd, and the soft soap. Of the three first are made all the varieties sold by the perfumers. The various fatty matters which, with the addition of alkalies, enter into the composition of soap may be thus stated: oil of olives and almonds; tallow, hogslard, and the fat of various animals; rape oil; oil of beech, mast, and poppy seeds; fish oils of various kinds, and the oils of nuts, hemp, and linseed. Olive oils make a good pure soap, but the yellow is the cheapest—considered in reference to its cleansing qualities—and in many respects the best.

The reason why soap cleanses may be thus shortly stated: all soaps consist of lixivious or alkaline salts and fatty matter, and nearly all the dirt on our linen, clothes, and persons is made up of perspiration, grease, the dust which such grease attracts. In cold water these matters are nearly insoluble, but in warm water, to which lixivious salts have in any way been added, the greasy dirt discovers its affinity for the salts by mixing with them, and so becoming saponaceous: the soap attracts the soap. In this state the dirt is so far soluble that it may easily be washed out. The modern washing powders are nothing more than alkalies, to which must be added a certain quantity of liquid soap.

Having thus, we hope, satisfactorily answered the question, "What is soap?" a few sentences as to

ITS HISTORY

may not be out of place or uninteresting. The following particulars are abbreviated from an article, by the writer of this paper, which appeared in a little work now out of print:—

In the earliest times clothes were cleansed by water alone, the practice being to stamp on and rinse them in the waves on the sea-shore, in the same way as is yet practised by many uncivilised nations. We are told by Homer that Narcissa and her attendants washed their clothes by treading upon them in pits into which the water had collected; and it is not till a much later period that we have mention made of a ley from wood ashes, though it is supposed that the *konia* mentioned by Aristotle and Plato was a substance of a nature similar to ley, and was used for washing oil and wine jars.

In the time of Paulus Ægineta, however, the use of unslaked lime as a detergent was not uncommon; dry potash was unknown, and Pliny tells us that ox galls were employed for removing spots from the skin. Fixed lixivial salts, however, were occasionally used to cleanse linen, and they, probably, were the *litrum* or *nitrum* of the people of Attica. In the baths, *litrum* was used by the Romans, who, it appears, had little inventive genius of their own, they being in the habit of borrowing from Greece whatever the genius of that nation discovered or made applicable.

In Egypt, the birthplace of the arts, mineral alkali, however, was early brought into use; and Pliny makes mention in more than one place of Egyptian nitre being brought in corked vessels to Rome. Strabo also tells us that alkaline water was used in Armenia by the scourers for washing clothes; and from the works of the learned Schöttgen we learn that alkali, or soda, was used by the Hebrews for cleansing purposes. In the sacred writings it is called *bonth*.

In cleansing clothes and washing the body, soap is of comparatively modern application; and though the ancients used the juices of some saponaceous plants for that purpose, it is certain they were unacquainted with the material at present employed, and that the combination of lixivious salts and tallow was quite unknown to them.

The very earliest mention of soap is found in the works of Pliny, the historian, and Galen, the physician, who tell us that it was anciently made from goats' fat and the ashes of the beech tree, and that there were two sorts, hard and soft. Galen, indeed, in a work on simple medicines, speaks of soap as having been made of ox's, goat's, and sheep's tallow, strengthened with quicklime, which process corresponds with that at present in use in Germany, while the French, by a later invention, employ oil and mineral alkali. German and Gallic soap are frequently mentioned by later writers, and it is generally acknowledged that the ancients used soap to dye and beautify the hair, the Roman gallants, no less than their modern descendants, being anxious to give their hair additional lustre by the employment of cosmetics. We read in the works of various authors, of soap being used as a dye or pomatum for the hair rather than as a washing material.

> "Caustica Teutonicos accendit spuma capillos
> Captivis poteris cultior esse comis;"

says the poet; which may be thus imitated:—

> "Dye thy hair with soap, and it will quickly be,
> More fine than German wigs in their captivity."

It is not unlikely that when Martial wrote this couplet, he intended it as a delicate piece of flattery to Roman pride, Domitian having vainly fancied that he had conquered the whole German nation. It is probable that the Germans coloured or tinged their soaps with the juice of plants.

It was then the fashion to anoint the hair with coloured soaps, and to put the head in a net or caul of bladder at nights. Soap being little used as a detergent, washing clothes among the Romans was considered rather an ignoble employment, and was only practised by the indigent.

The history of soap among the moderns is the history of civilisation; as people have become more refined, they have used more soap.

In our own country the use of soap has been in a great measure retarded by fiscal restrictions. In a curious pamphlet entitled a "True Narrative concerning the Soap Business," which was printed for Nicholas Bourne, in 1641, are many facts relating to the difficulties under which the manufacturer of this article was then subjected. Many books and pamphlets in the British Museum contain petitions from the manufacturers in the time of queen Anne, praying to be relieved from the oppressive taxes then first imposed. But between the two periods (1641-1705) we can learn nothing of the quantities or description of soap usually made. In the pamphlet of Nicholas Bourne, he complains of the soap makers of London—in 1633—being injured by the monopoly enjoyed by a company called the "Governor Assistants and Society of Soap Makers in Westminster," who, on condition of paying to the king a duty of £4 per ton on 5000 tons annually, had allowed them the exclusive right of manufacture. Against this monopoly the soap makers of London—not more than twenty in number—petitioned; and the company, in return, procured an order from the government which further protected their rights, and restricted the sale of soap which had not been assayed by them. The soap makers resisted, and Star Chamber informations were laid against sixteen of them for opposing the company. The defendants pleaded; but having put in their answers one day too late, were all committed to prison. The judges certified "all the answer, except the four first words and last ten, as fit to be expunged," and the defendants were fined in various sums, from five to fifteen hundred pounds each, and ordered to be imprisoned during his majesty's pleasure. The poor soap makers went to prison; suffered much for about forty weeks, during which time ten of their number died; and were only liberated to witness the proclamation of new edicts giving still greater powers to the company. For more than five years these tyrannical restrictions remained in full force, and many of the London soap manufacturers were again and again committed to prison. At last—in 1637—the company, having "vexed the whole kingdom with their soap," obtained from the king permission to give up the patent. But this permission, which was not sought till the opposition to the company became too strong to resist, was granted to them only on condition of their paying to his majesty the sum of £40,000. To better enable them to comply with the royal demand, it was further decreed that the poor soap makers of London should pay £20,000 to the company for the materials of their trade—materials which had so long been used to oppress and tyrannise over the manufacturers.

From this time various restrictions have been from time to time removed. The soap maker now pays an annual licence of £4, besides his excise duty.

With this long preface over—a preface, however, necessary to a proper comprehension of what follows, we may proceed to detail the particulars of our visit to

JOHN KNIGHT AND SON'S SOAP FACTORY,

in Old Gravel-lane, Wapping. Many of our readers know very little of Wapping—some of them, possibly, having only heard of it in Dibdin's Song or Joe Miller's Jest-Book. For their particular information, however, we may state that it is a district in the east of London, on the Middlesex side of the Thames, a little below the Tower, chiefly inhabited by sea-faring men, and tradesmen dealing in commodities for the supply of shipping and sailors; that it was originally a marsh frequently overflowed by the Thames, and first recovered in the reign of queen Elizabeth; that on the banks of the river in this not overclean or elegantly-built locality, were to be seen, within the memory of the "oldest inhabitants," the gibbets on which our ancestors were used to hang pirates in chains; and that in the present day it would be considered by the denizens of St. James's and Belgravia a strange outlandish sort of place, in which dull warehouses, queer-looking little docks, swinging-bridges, narrow streets, dirty houses, and an ill-dressed population, were the most remarkable objects. But it has, nevertheless, its literary interests, one or two of which we may note in passing. Strype tells us that king Charles having hunted a stag from Wanstead, in Essex, killed him in a garden in Nightingale-lane, Wapping, and that the proprietor of the place was sorely vexed at the multitude of people who assembled on the occasion, to the great damage of his favourite plants and flowers. In Wapping, "in a strange lane or alley," like many which are to be found in the present day, lived Ames, the antiquary, the author of a very useful, but now little known work, entitled "Typographical Antiquities, or the History of Printing in England." To a wretched ale-house called the Red Cow, in Anchor and Hope-alley, near King Edward's stairs, in Wapping, the notorious Judge Jeffries retreated, in the disguise of a common sailor, after the abdication of king James. Being found by a scrivener whom he had formerly insulted, leaning out of a window of the tavern in all the audacity of false security, he was dragged out and insulted by the populace. It was Wapping that Johnson advised Boswell to explore if he would note the curious modes of life which some people in London pursued—a piece of advice which Bozzy followed, and was disappointed, as a matter of course—as he naturally would be if the great doctor did not go too.

Having recalled these things as we make our way through Old Gravel-lane from the city, we pause at a short distance from the Thames Tunnel; and, passing down a little street on the right, we proceed through a pair of large gates, and find ourselves within the premises of John Knight and Son, soap and candle makers. After making ourselves known to the heads of the firm, one of whom accompanies us over the factory, we make the circuit of the entire space within the walls, and jot down our conclusions by the way.

We are standing in the centre of a large open court. On the right of the entrance are the dwelling and counting-houses; to the left are various low buildings used for various purposes, while before us lies the soap factory itself; the latter consists of a large range of buildings, no doubt admirably adapted for the purposes for which they are used, but not remarkable for any particular architectural display. The space in front was occupied at the time of our visit by several four-horse-wagons, into and from which were being emptied various articles necessary to the trade; a vast number of greasy-looking tubs filled with tallow, and several frames in which mould candles were undergoing the process of cooling; in the back-ground, to the left, was a great heap of refuse lime and alkali, which is afterwards used for manure; and numbers of men and boys passing to and fro gave to the scene a rather animated appearance. Attached to the counting-house is a small distillery and laboratory, fitted with apparatus for testing the quality of the soaps; but into that we did not enter.

We proceed, then, under the guidance of our intelligent conductor, to the soap factory, and first enter

THE FAT ROOM.

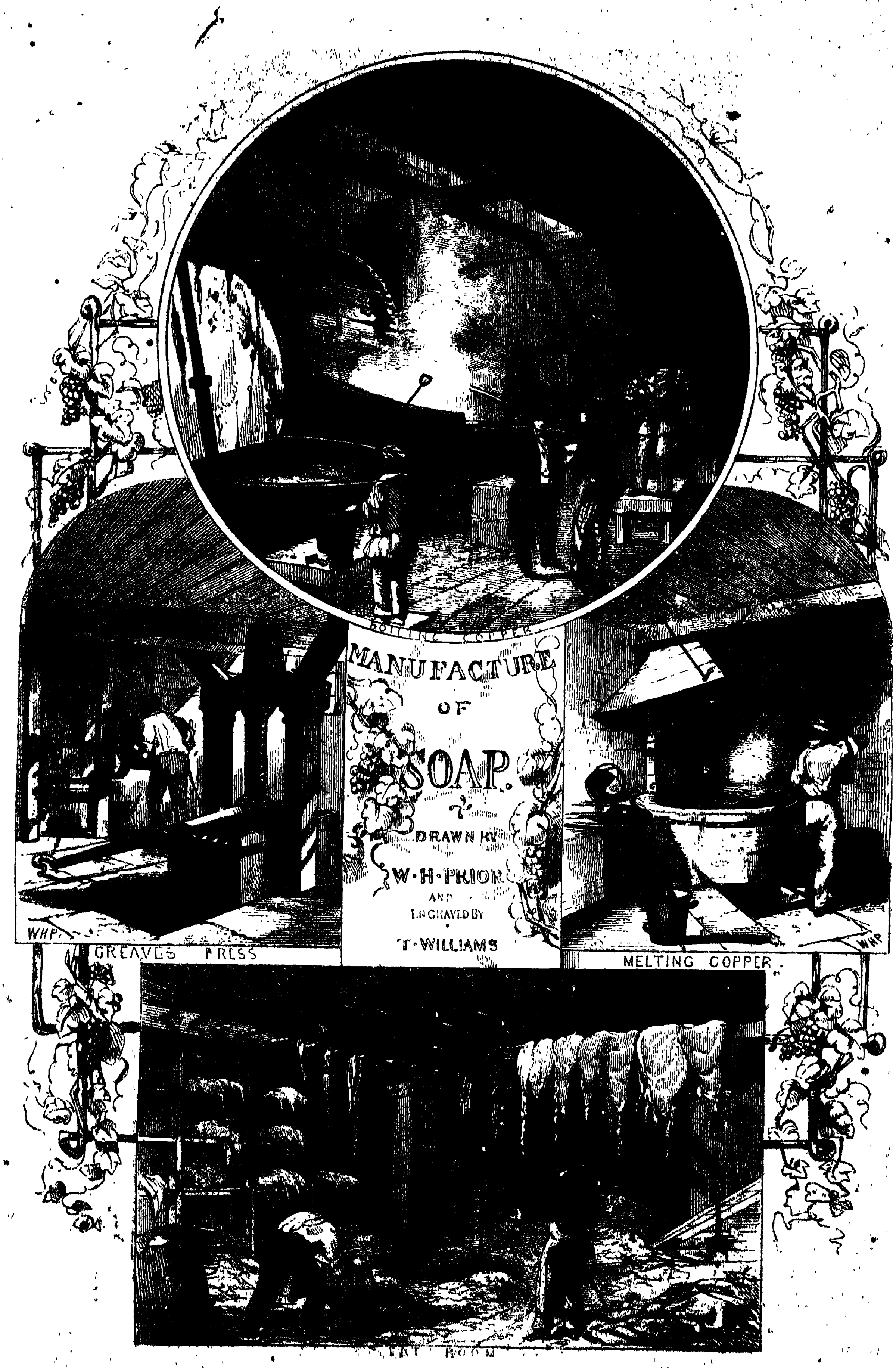
A glance at the engraving will convey a better idea of the general appearance of this apartment than could any words of ours. Here, hanging on rafters, ranged on shelves, and lying on the ground, are vast quantities of the raw material from which the soap is made. It is a strange sight indeed; and our nose is assaulted in a way we can hardly describe—a fat, tallowy, disagreeable smell pervades the atmosphere, which, at first, is anything but pleasant; but as we stand for a minute or two among the immense masses of yellow beef and mutton fat, the sensation passes imperceptibly away. We are told that a soap factory is, on the whole, an extremely healthy place. Here all the fat is weighed as it is received, whence it is taken as it is required to the

MELTING COPPERS.

These are merely large coppers with furnaces beneath, in which the fat is melted. The scent here is, if possible, more abominable than in the fat-room. The operation of melting is extremely simple. After the fat has been melted down till no more liquid can be obtained from it, the residue is gathered up and carried to a powerful press where it is formed into the greaves with which dogs are fed. Several of these coppers are ranged side by side; in some of which the best fat is melted for the superior kinds of soap, and into others the kitchen stuff finds its way for the commoner descriptions. A room in which the heterogeneous materials called kitchen stuff is received is on the ground floor; but it differs little from the fat-room, except in its more disagreeable stench. The liquid fat is carried by pipes from the melting to

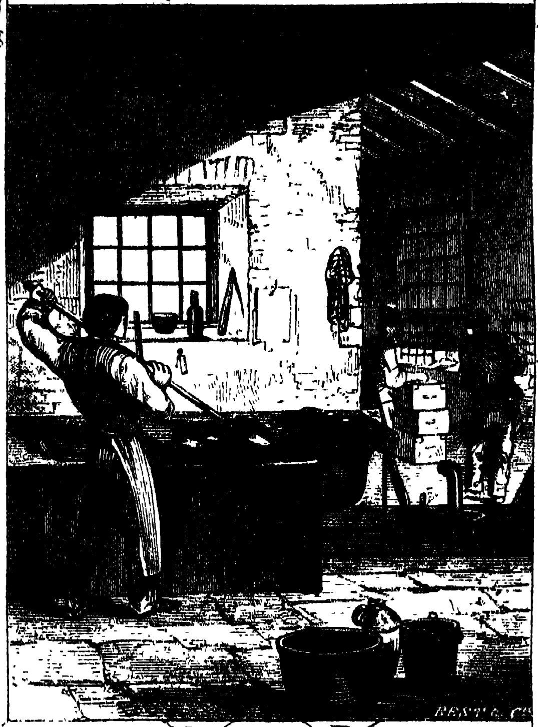
THE BOILING COPPERS,

where we will follow the process. For a minute or two we see little for the steam which arises from the immense boilers ranged along the walls; but soon recovering our sight, we perceive standing before each copper a couple of men, who keep continually stirring the liquid contents with long wooden rakes. Each of these coppers is filled with the materials for making yellow soap, in various states of preparation. The liquid fat, the alkaline liquor and the rosin having been added together, the latter in a state of fine powder, the boiling commences. Rosin, it should be observed, though differing so much in appearance from tallow, possesses nearly the same chemical constituents. Being cheaper than tallow, it is used extensively by the soap maker. Rosin, though very soluble in alkaline menstrua, says Dr. Ure, is not susceptible like fat of being transformed into an acid, and will not, of course, saponify or form a proper soap by itself. The more caustic the alkali, the less consistence has the resinous compound which is made with it. Hence fat of some kind, used in considerable quantities, must be used with the rosin. Sometimes for the commoner descriptions of yellow soap, equal quantities of fat and rosin are used; but for the better kinds, about one-third rosin to two-thirds tallow is the usual proportion. As alkaline matter cannot be neutralised by rosin, it preserves its peculiar acrimonious odour in poor soaps, and acts too powerfully on


BOILING COPPER
MANUFACTURE
OF
SOAP.
DRAWN BY
W·H·PRIOR
AND
ENGRAVED BY
T·WILLIAMS
WHP
GREAVES PRESS
MELTING COPPER
WHP
FAT ROOM

ALKALI CISTERNS.

CUTTING INTO BARS



GRAINED SOAP MAKING

FILLING MOULDS

STAMPING & PACKING.

woollen and other animal fibres to which it is applied. Rancid tallow, it is said, serves better to disguise the strong smell of rosin in soap than any oil or other species of scent. The materials are kept boiling for a considerable time with an excess of caustic ley, being kept continually stirred so that all the materials shall incorporate; and when the "paste"—as the soap in this state is called—is found, on cooling a sample of it, to have acquired a solid consistency, and, when diffused in a little water, not to leave a resinous varnish on the skin, the soap may be said to be finished. The soap maker next proceeds to draw off the superfluous ley, and to purify the "paste." For this purpose a quantity of ley of a much less caustic quality is added; the whole mass is again heated, and after being well-stirred is allowed to settle and drain off its leys. A third, and sometimes a fourth, service of leys is introduced, and during each operation the agitation and period of repose goes on as at first. The pan being now skimmed, and the scum reserved for another operation, the soap is drawn off, and introduced into the soap frames, there to cool and harden till it shall be in a fit state to cut into bars.

But before we speak of this process we must, in order to render the foregoing quite plain to the reader, visit the

ALKALI CISTERNS.

Near the coppers, for the convenience of ready transportation, are situated several vats or coppers, in which the alkali is refined till it is in a proper state. It is brought to the soap boiler in a solid and impure form, as a crude and imperfect carbonate of soda or potash, and it is necessary for him to reduce the dry greyish powder, as it then appears, to a liquid and highly caustic state. The alkali, or "white ash," as it is called, used by the soap-maker, is soda, made principally by the decomposition of salt. The salt of commerce consists of chlorine and sodium; and the decomposition and separation of one from the other is produced by means of a peculiar treatment with sulphuric acid. From this process there result "muriatic acid and sulphate of soda. This sulphate is converted into a carbonate of soda by contact with carbon; and lastly, the carbonic acid is driven from the carbonate, leaving the soda in a caustic state, and forming, when in solution with water, the liquor which soap-makers call a ley or lye." Before the alkali can be used by the soap-maker, it must be deprived of the carbonic acid which is always found combined with it; for this purpose it is necessary to filtrate it through beds of lime. No matter whether the alkali used be the barilla and kelp of Spain and the Orkneys, or the soda made from common salt, the process it must undergo is altogether the same. The crude soda after being ground, is stratified with lime in cast-iron vats, six or seven feet wide by four or five deep, the lowest layer being unslaked or shell quicklime. The vats have a false bottom perforated with holes, and a series of lateral tubs beneath, through which the leys trickle off, after filtration, in a clear and caustic state. The preparation of ley for yellow and mottled soaps differing little, we may merely observe that the alkaline liquor is pumped from the vats into the boiling coppers, where it is mixed with the necessary quantity of oil and rosin in the manner described. When the liquor has spent all its strength, it is pumped from the soap by means of a barrel which descends to the bottom of the boiler; fresh ley is introduced, and this process is repeated over and over again, as we have seen, till the soap is considered to be in a fit state for the frames.

FILLING THE MOULDS OR FRAMES

is also a very simple operation. The soap being now in a liquid state, it is ladled from the coppers into buckets or pails, and conveyed to the frame-rooms above, where it is poured into the frames. The frames consist of a series of rectangular bars of wood or iron, measuring internally 45 inches by 15, placed one on top of the other, sometimes to the height of twelve or fourteen feet. Into the well or cistern thus formed the soap is poured, and allowed to remain for four or five days, according to the weather. In the iron frames it cools much more quickly than in the wooden ones, in consequence of the greater retention of heat by the latter. When the entire mass has become cold and solidified, the iron fastenings of the frames are removed, and the rectangles being removed one by one, a solid, compact body of soap remains the exact shape of the interior of the frame. So well do the bars composing the mould join together, that no seams or openings are observable in the soap after the rectangles have been removed. Many frames contain as much as three thousand pounds' weight of soap.

CUTTING INTO BARS.

Having arrived at this stage, the soap is cut first into slabs, and then into bars, as we see them in the shops. The purest and best yellow soap made at this establishment is afterwards stamped, "John Knight and Son's Primrose Soap," by means of a small hand-stamp of brass or iron. The cutting of the mass of soap into bars is a very neat and effective operation. One of the workmen having marked the surface of the soap into parallel lines with a gauge-stick, in which are inserted sharp points, two men then draw a copper wire through the mass in the exact direction of the marks, one man guiding the wire, and the other drawing it through by means of a pair of handles. A slab of soap about three inches thick is thus cut off, which is immediately removed to a kind of wooden platform, to be cut into bars by another set of operators. Twelve slabs being laid horizontally, one over the other, they are again marked off with a gauge, and a piece of wire passed through them in a downward direction, which process divides them into bars about three inches square; in which state they are removed by another workman, and piled into stacks ready for sale. The operation of cutting into bars is shown in the engraving.

All kinds of soap are made in much the same kind of way we have described. A little palm-oil, the produce of the palm-tree of Africa, is added to yellow soap to give it the proper colour; and the peculiar appearance of mottled soap is produced by sprinkling into the liquid mass a quantity of potash ley through the rose top of a garden watering-pot. The mottled soap is hardened in frames of a rather different construction, and presents the appearance, when cold, of a hollow square mass, which is cut into bars in the same way as we have just noticed. We come now to speak of the various

TOILET SOAPS,

which are but simple modifications of the yellow and curd soaps variously scented. For the purpose of this paper we visited the establishment of Messrs. Cleaver, in Red Lion-square. This firm are the great producers of the kind of soap known as Honey Soap, which is, in fact, but a refined variety of the best and purest yellow, scented according to taste, stamped beneath a small machine, and packed in boxes as we see it in the shops of the retailers. The apparatus used in remelting and refining are of a smaller and neater construction than those of the factory, but the process is nearly identical.

Curd, or white soap, consists almost wholly of the best tallow prepared with alkali. It may be noticed, however, that in the preparation of yellow soap, some manufacturers, with a view of increasing the quantity and decreasing the price, are in the habit of mixing a quantity of water with the liquid soap in the frame—a practice more honoured in the breach than the observance.

From analyses made by Dr. Ure, it has been found that the perfumers' white, or curd soap, consists of, in each 100 parts—soda, 9; fatty matter (tallow), 75; water, 16;—London or Glasgow yellow soap—soda, 6·4; fat and rosin, 70; water, 23·6;—foreign Castile soap—soda, 9; oily fat, 76·5; water and colouring matter, 14.5; cocoa-nut oil soap—a remarkable variety, which possesses the property of dissolving in sea-water—soda, 4·5; cocoa nut lard, 22; water, 73·5.

The kinds known as white and brown Windsor, cinnamon, musk, rose, and other fancy soaps, are but curd or yellow soap remelted, modified, refined, and perfumed.

There is yet another kind which is known to the housekeeper as

SOFT SOAP.

This variety is used extensively in the woollen manufacture, and differs considerably from hard soap in its appearance, consistency, and ingredients. Instead of tallow wholly forming the base, various fish oils are used as the oleaginous ingredient; and instead of soda, the carbonate of potash, brought to a highly caustic state, is the alkali. Instead of drawing off the leys, as in hard soap making, they are allowed to remain in combination with soft soap—the white specks observed being the tallow, which in the process of manufacture had combined with the salts of potash. Soft soap is not "framed," but is sold in casks and barrels.

We may now bring our remarks and our visit to a

CONCLUSION.

In the factory of Messrs. Knight are also made the candles commonly in use—namely, mould and dip, or store candles—but for the present we refrain from entering into a description of the processes employed.

Nor can we say much of the excise regulations observed at a soap factory, which of late years have been less strict than formerly. The alteration of the soap duties have been attended with the most marked success. In 1828, when the duty was £28 per ton, the quantity charged for home consumption was only 91,000,000 pounds. The year following the reduction of the duty to £14 per ton (1834), this quantity was increased to 104,790,000 pounds; in 1840 it had further increased to 127,000,000; and in this year of grace, 1852, the quantity consumed may be fairly estimated at not less than 150,000,000 pounds. Comment is quite unnecessary in the face of such facts. We close our note-book, we thank our polite conductor, and we conclude our visit. If the reader is not as gratified as we were, the fault lies in the pencil of the artist and the pen that describes this factory, not in any want of interest in the place itself. A few steps takes us to the Thames Tunnel. We walk thoughtfully through the famous and wonderful work of the elder Brunel; and, returning, take boat at the stairs, and come back by the silent highway to Westminster.

PEASANTS OF THE PYRENEES.

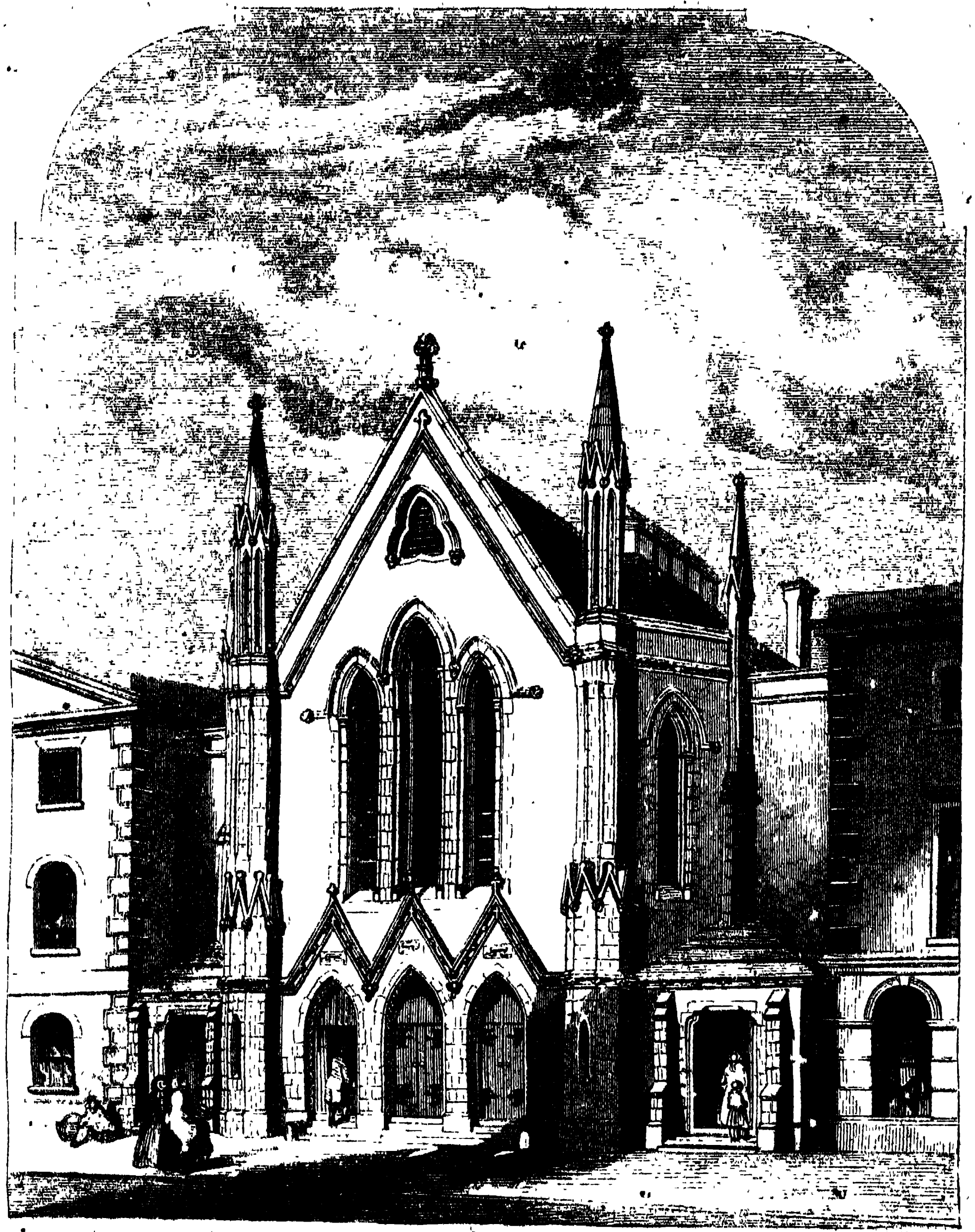
The peasants of the Pyrenees have all which their necessities demand within themselves. They grow their own flax, and one of their most busy occupations is to dress it. They do not steep it in water before beating it, as in England, but spread it on some sloping field or hill-side, where it undergoes no other process than what is effected by exposure to the weather. Not only is the flax prepared and woven for their own use, but the wool of the mountain sheep, undyed, is made into jackets, trousers, petticoats, as well as into various other articles of clothing. Thus supplied with the most common and necessary kinds of dress, their wants are equally simple as regards their furniture and food. A few brass or copper vessels for their milk are always used by those who make cheeses, as many of the peasants do, not only of the milk of cows, but of that of sheep and goats. For a churn they have a very simple substitute, being no other than a dried sheepskin. For keeping wine the skins of kids are frequently used, with the hair inside; and the same article is also converted into a large pocket or knapsack, which the little girls carry at their backs. The skin, when used in this manner, is kept entire, either the head or the tail of the animal being folded over the opening of the knapsack. All implements of husbandry used amongst the Bearnais are equally simple in their character. The pole of their little carts is often nothing more than the stem of a tree, cut off where it has divided into two branches, so that the ends of the two forks connect with the axletree; and the forks with which their hay is made are branches or stems of the same description, on a smaller scale. Their ploughing, such as it is, is effected by a sort of double process, requiring four oxen — two to go before with the coulter, and two others with another implement to turn over the soil. Both these are generally conducted by women. For millet and buckwheat, which succeed immediately to the earliest crops, the soil is merely turned over with a shovel after the earth and stubble are burnt in heaps, and strewn upon the field. The process of preparing the ground for wheat and oats is simple in the extreme. Both the seed and the manure are strewn upon the land, ploughed in together, then harrowed, and all is finished. The labour of carrying and spreading manure is performed almost exclusively by women, who sometimes carry it on a sort of hurdle into the fields, but more frequently in sacks on their heads. In the Valley d'Aspe it is taken to the fields in large woollen sacks placed upon the backs of donkeys. I find it stated in my journal, that in the beginning of August the maize in the Valley of Campan was waving in all its glory, having attained the height of a man's shoulder, and being still green. At the same time the reapers had begun to cut the wheat and oats; and I expected to have seen the ever-yellow corn-fields adorned, as they are in England, with those golden sheaves which have so many pleasant associations. To my disappointment, however, I found that the harvest in the Pyrenees was a very different affair from what it is with us; for no sooner was the wheat cut down than it was tied up in bundles, carried away upon the heads of the owners, and stowed into those innumerable little barns which adorn the splendid landscape; all this despatch being rendered necessary by the dishonesty of the people, which is such, that no one leaves his corn in the field after it is cut for a single night. I am sorry to make this confession in relation to the people whose simple lives I had previously thought so enviable; but I am also bound in common justice to state, that even their potatoes, when ready to be taken up, were always watched in the Valley of Campan.

EXHIBITION OF THE INDUSTRY OF ALL NATIONS AT NEW YORK.

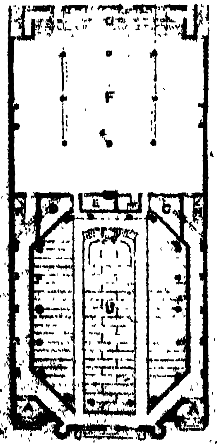
The plans for this projected Exhibition are matured, and will soon be laid before the public. A charter is drafted, and will be immediately applied for; and considering how beneficial to the country such an exhibition properly conducted must needs be, there can be no doubt that the application will immediately be granted. The building which it is proposed to erect will cover not less than *one hundred and sixty thousand* superficial square feet; and it is estimated that this can be erected and prepared for the Exhibition for two hundred thousand dollars. A large portion of this sum, which is all that it is necessary to secure, has been already subscribed. Contributions from more than three hundred and fifty of the English, French, Italian, German, Hungarian, Swiss, and Danish exhibitors at the Great Exhibition in London, including many cases of the most costly and magnificent articles displayed in the Crystal Palace are now awaiting transportation to America upon the announcement of the readiness of the building to receive them. Among the well-known works of Art which are to be sent to New York are the statue of the *Amazon*, by Kiss, which received a Grand Council Medal; a colossal statue of *Washington*, by MAROCHETTI, whose statue of *Richard Cœur de Lion* received a Council Medal; a statue of *Daniel Webster*, one of *Wesley*, by CAREW; and also the *Crucifixion*, exhibited by him at the Crystal Palace; the statue of *Prometheus*, by MANNING; the "*Veiled Figure*" by MONTI; and a silver statue of *Columbus* from the Sardinian Commissioners.

That the enterprise has fallen into the best possible hands, the names of the following gentlemen, who have consented to serve as the General Committee previous to the procurement of a charter, are a sufficient guarantee. They are Messrs. Francis W. Edmonds, Mortimer, Livingston, August Belmont, Watts Sherman, Alfred Pell, Theodore Sedgwick, William Kent, George Bancroft, Alexander Hamilton, jun., E. K. Collins, Johnson Livingston, William C. Bryant, John C. Develin and George P. Putnam. Of these the first five have been appointed trustees of the money subscribed until the election of officers under the charter; and at a meeting of the committee held February 19th, the following gentlemen were appointed an executive committee to carry out the details of the Exhibition. Theodore Sedgwick, Esq., chairman; Mortimer Livingston, William Kent, Alexander Hamilton, jun.; Alfred Pell, John C. Develin, and Johnson Livingston, Esqrs.

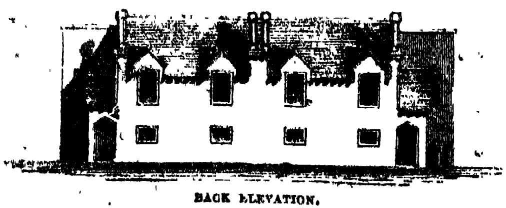
CHAPEL ARCHITECTURE.



WINCHESTER CONGREGATIONAL CHAPEL.—W. F. POULTON, ARCHITECT, READING.



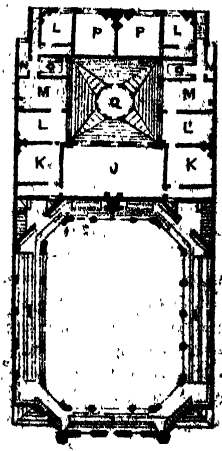
GROUND PLAN.



BACK ELEVATION.

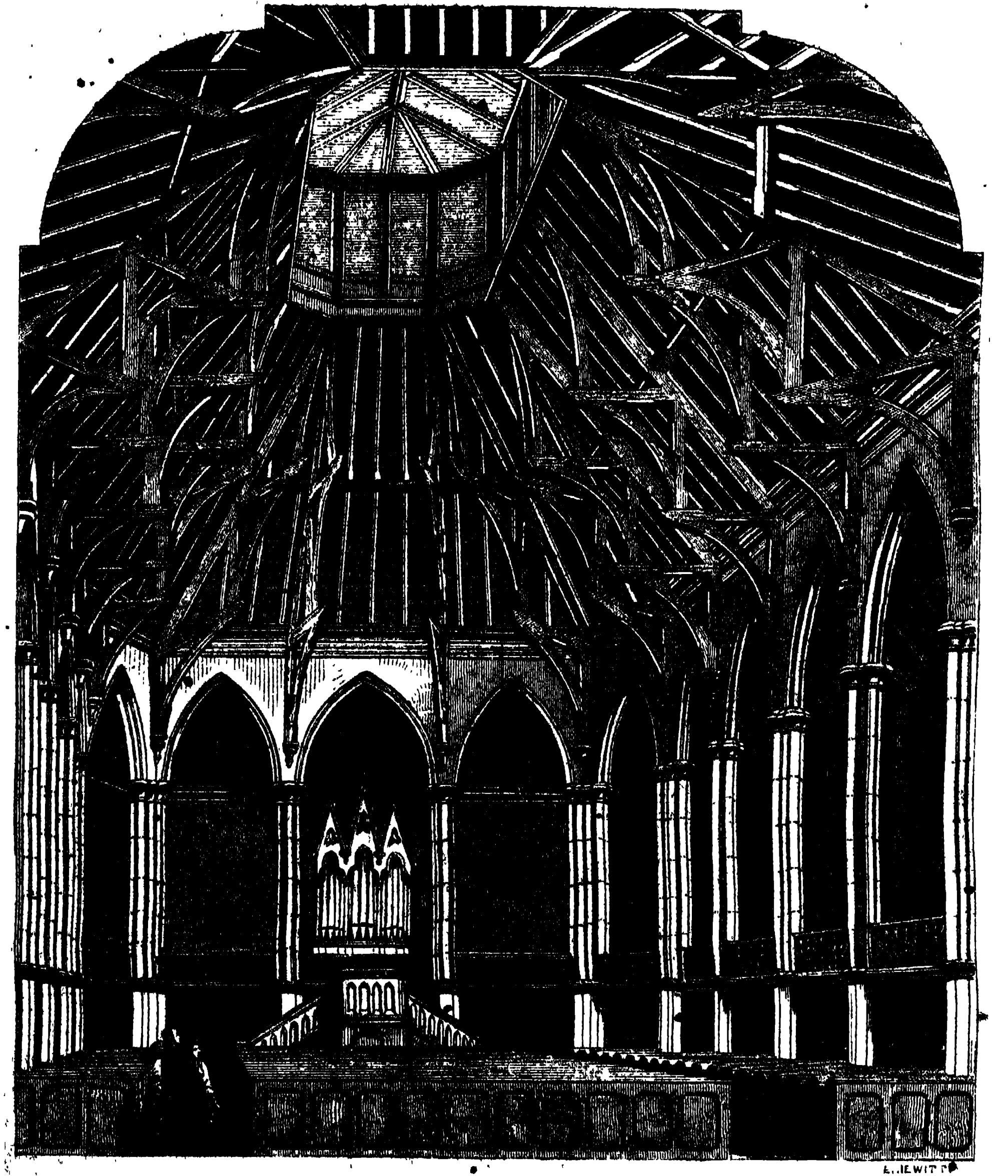
REFERENCES:—

- A. Entrance Lobbies
- B. Chapel 68 feet by 54 feet.
- C. Ministers' Vestry.
- D. Library.
- E. Store Room.
- F. School 54 feet by 53 feet.
- G. School Gallery.
- H. Staircases.
- I. Raised Seats of Chapel.
- J. Vestry 30 feet by 15 feet.
- K. Class Rooms.
- L. Bed Rooms.
- M. Kitchens.
- N. Closets.
- O. Pantries.
- P. Sitting Rooms.
- Q. School Lantern Light.



GALLERY PLAN.

THE style of Chapel building has undergone very marked improvement within the last half century. It was said to the reproach of the Jews, during the reign of Darius, that while they themselves dwelt in "ceiled houses," they suffered the house of God to "lie waste." For a long series of years a similar reproach might have been cast upon a large portion of professing Christians, who, if they did not allow their places of worship to "lie waste," at least bestowed far less pains upon them than upon their own habitations. Chapels were, with but very few exceptions, dull, heavy brick buildings, with square windows and ordinary house doors, destitute of pediment, porch, or pillar, and utterly devoid of all pretensions to architectural taste. But a pleasing change has taken place: almost every town has now ecclesiastical edifices which reflect credit alike on the skill of the architects, and the munificence of the founders.



INTERIOR OF WINCHESTER CONGREGATIONAL CHAPEL.

The ancient city of WINCHESTER presents an interesting example. In Jewry-street, one of the most public and respectable localities in the city, buildings are now in course of erection, for the use of the Independents, of which the accompanying engravings furnish correct representations. The Chapel, as our readers may perceive, will be in the early English style. It will be 68 feet long and 54 feet wide in the clear. The front elevation will be formed of white hard bricks, with Bath stone facings. The roof is to be open, and supported by eighteen fluted stone columns, with moulded arches. The light will be obtained, chiefly and necessarily, from a large lantern above. The Chapel is intended to accommodate about 400 persons on the central ground floor; raised seats, to be placed round the Chapel, will furnish room for 300 more; thus providing seat room for 700 persons. Space and other arrangements are provided for a gallery, should it be required, so that, altogether, there will be ample seat room for 1,000 persons.

Immediately behind the Chapel, and on a level with its floor, a spacious and airy SCHOOL-ROOM is to be erected, nearly 54 feet square. This is intended to be occupied both as a Sunday and Day School; the latter to be conducted on the British system. To this School-room there will be four entrances, two in the front, and two in the rear. There will be play-room for the children behind, cloak and hat-rooms within, and abundance of light from above. It is intended, further, to erect a gallery all round the School-room, twelve feet high, and sixteen feet wide. On this will be constructed a large vestry, two class-rooms for senior scholars, and two separate dwelling apartments for the Schoolmaster and the Chapel-keeper. The Chapel and the

School-room are to be lighted with gas, and properly warmed with a hot-water apparatus.

The entire expense of this erection is not to exceed Three Thousand Seven Hundred and Fifty Pounds.

It is our intention, as opportunity may offer, to present our readers with representations of such churches or chapels as may possess novelty of design or beauty of execution.

MATTHIOLI:—THE IRON MASK.

THE mystery which, for more than a century and a half, has enveloped the identity of the "Man of the Iron Mask," has been one of the most active sources of public curiosity throughout the whole period which has passed since his time. Numerous theories have been put forward, all with some semblance of probability, yet all unsatisfactory. Only one solution of the mystery, however, is supported by sufficient evidence to entitle it to acceptance. It is the result of M. Delort's examination of the archives of the French government, in which he found the correspondence of the French ministers of that time, which proved, beyond a doubt, that the mysterious prisoner was an Italian of the name of Matthioli.

This individual, about whose fate so much romantic interest has been excited, was secretary of state to Charles third duke of Mantua, by whom he was much favoured. Towards the end of the year 1677, the Abbé D'Estrades, ambassador from Louis XIV. to the republic of Venice, was anxious to induce the Duke of Mantua to allow the entrance of a French garrison into Casale, which was, in a great measure, the key of Italy. D'Estrades thought to effect his purpose by gaining over Matthioli to his schemes. The secretary readily lent himself to the accomplishment of the wily ambassador's object, and wrote a letter to the abbé in which he offered to devote himself entirely to the interests of the French king. In the course of the treaty between Louis and the duke, it was proposed to send Matthioli to the French court. This arrangement did not meet with the approbation of D'Estrades, who used his best efforts to delay the secretary's journey to Paris. He succeeded in postponing it from spring to autumn, when Matthioli arrived at the French capital about the end of November, 1678. His stay was short; after an interview with Louis, who received him with much favour and gave him a ring of great value, as an earnest of his future gifts, the Italian returned to Mantua. The advance of the French troops to garrison Casale, caused great alarm to the neighbouring states. Remonstrances were made to Charles, which his secretary secretly supported, though he continued to be the apparent ally of the French agents at the ducal court. His duplicity, however, could not long be concealed; and suspicions of his fidelity to the interests of Louis strengthened into actual evidence of his treachery. The French ambassador reproached and threatened, but to no purpose; the unprincipled secretary, in the very face of his proved unfaithfulness, still assured the agents of Louis of his firm adherence to their master's interests, but informed them that the Duke of Mantua had been obliged to conclude a treaty with the Venetians, the object of which was directly opposed to that entered into with the French. M. Pinchesne, the French agent at Venice, though convinced of the perfidy of Matthioli, did not break with him, but advised him to go and confer with D'Estrades at Turin: the secretary followed this advice, and thus fell into the plot which had been concocted for his ruin.

Disappointed in his political intrigues, the vindictive Louis had resolved to take signal vengeance on the treacherous frustrater of his plans. He accordingly sent orders to the abbé to arrest Matthioli, and guard him in such a manner, "that not only may he not have communication with any one else, but that he may have cause to repent of his own bad conduct." During his negotiations with D'Estrades at Turin, Matthioli complained to the abbé of want of money; the ambassador readily caught at a circumstance so favourable to the execution of the plan which he had to accomplish, and recommended him to meet Catinat at the French frontiers, near Pignerol, where D'Estrades would also be present. The doomed secretary again aided in the accomplishment of his own ruin by doing as the abbé suggested. Three miles from the place of rendezvous they were stopped by a river, the bridge of which had been a short time before broken down by a flood. Matthioli himself assisted to repair the bridge over which he was to pass into the most hopeless and wretched of all captivities. Being questioned at the conference with Catinat, he informed those present where all the original papers relative to the delivery of Casale would be found, though it seems that the statement then made in reference to these documents was false, as they were afterwards discovered concealed in a well at Padua. At the end of the conference he was arrested without ceremony, and after his arrest no one was permitted to approach him. The most extraordinary precautions were taken to prevent his discovery, particularly that of obliging him to wear a mask during his journey when he saw any one, to conceal this violent breach of the law of nations, Matthioli being at this time plenipotentiary of the Duke of Mantua for concluding a treaty with France; and the same reasons for concealment existed till his death, since that event happened while both Louis and the Duke of Mantua were still alive. This accounts for his confinement being always solitary and secret; one act of diplomatic treachery, however, could never warrant the infliction of the most horrible of all punishments, solitary confinement, attended by such rigours as his were, for twenty-four years in a dungeon; but Louis, whether as a man or a sovereign, was one of the most cruel and tyrannical characters to be met with in the whole range of history.

For the first few days of his imprisonment Matthioli was well treated, but his gaoler afterwards received instructions to the effect, that "It is not the intention of the king that Sieur de Lestang,"—the name given to him,—"should be well treated, nor that, except the absolute necessaries of life should he have anything given to him, that may make him pass his time agreeably." Repeated injunctions, to this effect, are a proof how much importance the rancorous Louis attached to his victim being compelled to drink his bitter draught of captivity to the very dregs. The harshness of his treatment and the utter hopelessness of relief or liberty seem to have affected the intellect of Matthioli, as his gaoler reports that in his frenzy and despair the wretched prisoner used to give way to the most violent paroxysms of mental derangement, during which he found vent for his rage by writing with charcoal abusive sentences upon Louis on the walls of his prison. A mad Jacobin monk, who was confined in the same prison, was put into the cell with Matthioli, but died after their removal to another and more wretched prison at Exilles. After the death of the monk, Matthioli was again removed to the island of St. Margaret, on the coast of Provence. During the journey he was conveyed in a chair covered with oil-cloth, that the possibility of his being seen or spoken to might be prevented. It was during this journey, there is reason to believe, that the permanent use of the mask, which he was afterwards compelled to wear till his death, begun. This mask was not made, as has been erroneously supposed, of iron, but of black velvet, strengthened with whalebone, and fastened behind by a padlock.

Amongst the anecdotes given of this prisoner, who has so long been the object of so much general curiosity, it has been mentioned that he wrote his name and rank with the point of a knife on a silver plate and threw it out of his window, and that it was picked up by a fisherman who brought it to the gaoler. The fisherman, having satisfied the man that he could not read, was released. Again, it is said that he covered one of his shirts with writing, and threw it also out of his window, and that a monk having found it took it to the governor of the prison, with a declaration that he had not read it, but two days afterwards he was found dead in his bed.

After eleven years' confinement at St. Margaret's, Matthioli was removed to the Bastile. The same secrecy as before prevailed during his journey to Paris. At dinner he sat with his back to the light, and his gaoler opposite to him, with a brace of pistols on the table. While at the Bastile, he was on a few occasions allowed to go to mass, but the guards had strict orders to shoot him if he spoke to any one. At length he died, at the age of sixty-three, after five years most rigorous confinement in a dungeon of the Bastile. After his death, everything was done that could destroy all traces of his former existence: his clothes were burned, as well as the furniture of his cell; all plate of every kind was melted down, the walls of the dungeon were scraped and then whitewashed, the floor was newly paved, the old ceiling taken down, the doors and windows burnt, and every corner most rigidly searched.

It has been stated, on more than one authority, that Louis XV. well knew who the celebrated state prisoner really was, and affirmed more than once that he was the minister of one of the Italian princes; but this confession was considered at the time only as an evasion to put a stop to a more rigid inquiry. But let the unhappy victim be whom he might, the atrocious and persevering revenge of which he was the object deserves the heartiest execration of all future posterity. His perfidy may have been great, but outraged humanity will not accept it as palliation or excuse for the barbarous and continued cruelties which he suffered at the hands of the execrable Louis.

A MEDIÆVAL PASSPORT.

The following characteristic *feuille de route* of a traveller in the middle ages explains itself, and is worth copying:—

"To you, holy lords, bishops established in your apostolic sees, abbots, abbesses; to all you fathers in Jesus Christ; to you dukes, counts, governors, captains, and other officers; to all you who believe in and fear God; I, an unworthy sinner, the least of the servants of God, bishop or abbot of — —, where repose the mortal remains of the ever-blessed martyr (or confessor) — —, wish eternal salvation in God.

"I give you to understand that the traveller named ——, born at ——, in ——, has come to me and has asked of me advice about a sin which he has committed at the instigation of the common enemy. In accordance with canonical custom, I have decreed that this man must place himself in the condition of those who go on pilgrimages for the redemption of their souls. Know, then, that when he shall present himself to you, you must by no means think evil of him, or seize his person, but, on the contrary, provide him with a lodging, fire, bread, and water, then, without seeking for a recompense, permit him to pursue his journey to the holy places.

"Act thus, for the love of God, and the respect of the holy father (the pope). You shall obtain your reward in eternal life; for in this stranger it is Jesus Christ whom you shall have received and nourished. Remember that the Lord has said: 'I was a stranger, and you took me in;' and again, 'Inasmuch as you have done it unto the least of these my brethren, you have done it unto me.' But to what purpose is a long exhortation? A word is sufficient for the wise. I commend myself to your prayers. Be strong in Jesus Christ, and become worthy of the dwelling-place of angels."

THE LYRE BIRD.

At the close of the last century, the Governor of New South Wales endeavoured to check the roving propensities of certain turbulent Irishmen by corporeal punishment; but as this did not prove effectual, he determined to convince them of the difficulties and dangers of a wandering life, by actual experience. Four of the hardiest of them were therefore chosen, and fitted out for a journey of discovery, under the charge of three trusty guides, who were to lead them back, when fatigued and exhausted with their journey, over the most difficult and dangerous part of the country. A conspiracy to murder the guides was detected before the party set out, and it was consequently increased by the addition of four soldiers, and began its enterprise on the 14th of January, 1798. The project of the Governor completely succeeded. On the 24th the soldiers returned with three of the Irishmen, who, on gaining the foot of the first mountains, were so greatly fatigued, and also so fearful of the prospect before them, that they asked to be allowed to return with the soldiers. The rest of the party returned on the 9th of February. They appear to have travelled about one hundred and forty miles in a south-west direction from Paramatta.

They brought in with them a bird, which they called a pheasant; it resembles the common one in size, but its limbs are longer in proportion, and there are other considerable points of difference. The wings are short, concave, and rounded, and the quill feathers are lax and feeble; the general plumage is full, deep, soft and downy. The tail, however, is very remarkable: it is modified into a beautiful, long, plume-like ornament, representing, when erect and expanded, the figure of a lyre; hence its name—the Lyre Bird, while as the type of a new genus, it has received the appellation of *Menura superba*.

This ornamented tail is restricted to the male bird. It consists of sixteen feathers; of these the outer one on each side is broadly but loosely webbed within, its outer web being narrow; as it proceeds it curves outwards, bends in, and again turns boldly outwards and downwards, both together resembling the framework of an ancient lyre, of which the intermediate feathers are the strings; these feathers, except the two central, which are truly but narrowly webbed on the outer side, consist each of a slender shaft, with long filaments, at a distance from each other, and springing out alternately. The appearance of these feathers, the length of which is about two feet, is peculiarly graceful; their colour is amber-brown, but the two outer tail-feathers are grey tipped with black, edged with rufous, and transversely marked on the inner web with transparent triangular bars. In the female the tail is long and graduated, and the feathers are perfectly webbed on both sides of the shaft, although their texture is soft and flowing. The general plumage of the *Menura* is amber-brown above, tinged with olive, and merging into rufous on the wings, and also on the throat. The under parts are ashy-grey. Mr. Gould says that, were he requested to suggest an emblem for Australia among its birds, he would select the Menura or Lyre Bird as the most appropriate, being not only strictly peculiar to Australia, but as far as is yet known, to the colony of New South Wales.

The bird is exceedingly shy, and hence the same eminent Naturalist says: "While among the bushes I have been surrounded by these birds, pouring forth their loud and liquid calls for days together, without being able to get a sight of them; and it was only by the most determined perseverance, and extreme caution, that I was enabled to effect this desirable object, which was rendered the more difficult by their often frequenting the most inaccessible and precipitous sides of gullies and ravines, covered with tangled masses of creepers and umbrageous trees: the cracking of a stick, the rolling down of a small stone, or any other noise however slight, is sufficient to alarm it; and none but those who have traversed these rugged, hot, and suffocating brushes can fully understand the excessive labour attendant on the pursuit of the Menura. Independently of climbing over rocks and falling trunks of trees, the sportsman has to creep and crawl beneath and among the branches with the utmost caution, taking care only to advance when the bird's attention is occupied in singing, or in scratching up the leaves in search of food. To watch its actions it is necessary to remain perfectly motionless, not venturing to move even in the slightest degree, or it vanishes from sight as if by magic."

In some of the more accessible bushes, it may, however, be frequently seen, and even on horseback be closely approached, the bird apparently showing less fear of a horse than a man. The bird is sometimes pursued by dogs trained to rush suddenly upon it, when it immediately leaps upon the branch of a tree, and, its attention being attracted by the dog which stands barking below, it is easily approached and shot. Another mode of capturing this bird is by wearing the tail of a full-plumaged male in the hat, keeping it constantly in motion, and concealing the person among the brushes, when the attention of the bird being arrested by the apparent intrusion of another of its own sex, it will be attracted within the range of the gun. If the bird be hid from view by surrounding objects, a shrill whistle, or any other unusual sound will generally induce it to show itself for an instant, by causing it to leap with a gay and sprightly air upon some neighbouring branch, to ascertain the cause of the disturbance, when it easily becomes the prey of an expert shot.

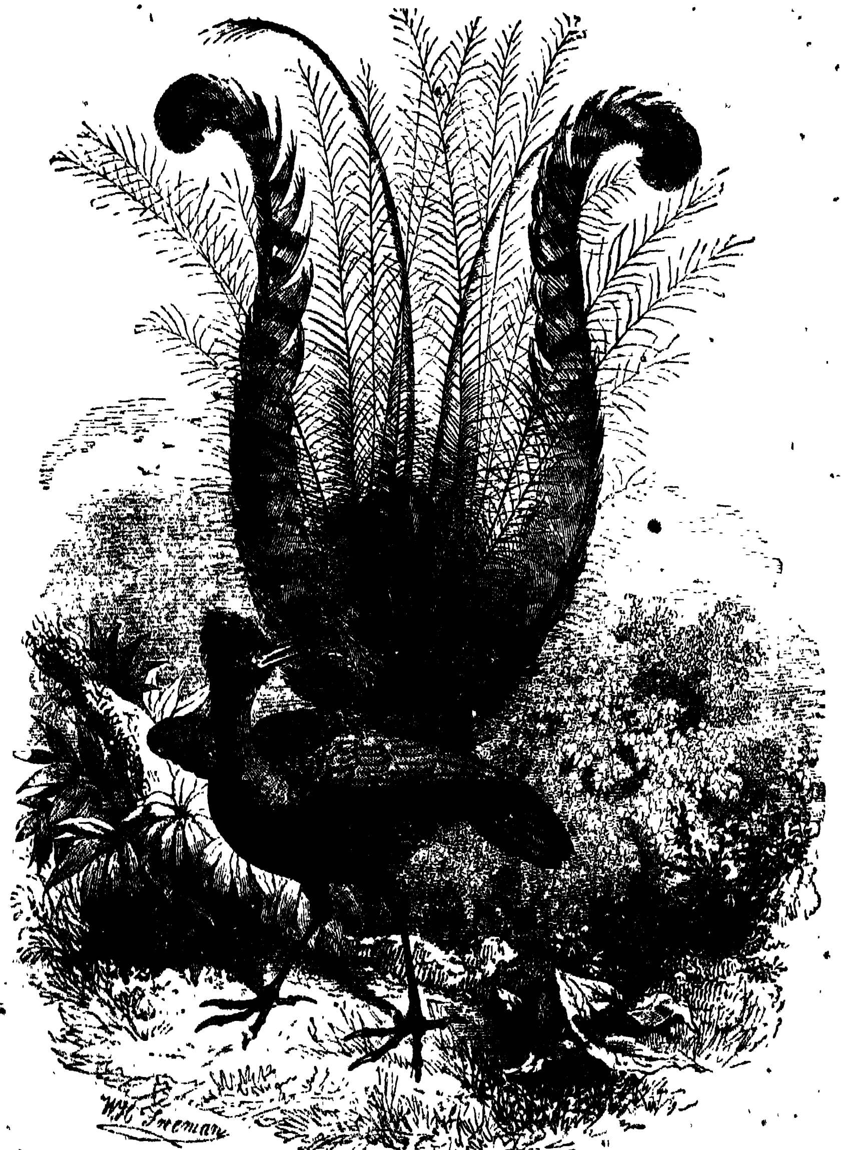
"It is much to be regretted," Mr. Bennett justly remarks, "that human beings are so eager to destroy, even to extermination, the races of animals, useful or dangerous, which may be found in a new country. In the settled parts of a colony, the harmless kangaroos and emus are rarely seen, when they might be easily domesticated about the habitations. The same remark applies to the Lyre pheasant. Why are they not domesticated before, by extermination, they are lost to us for ever?"

These birds build in old hollow trunks of trees which are lying on the ground, or in the holes of rocks. The nest is merely formed of dried grass, on dried leaves scraped together. The female lays from twelve to sixteen eggs, of a white colour, with a few scattered light blue spots. One nest was observed placed on a prominent point of a rock, in a situation quite secure from observation from behind, but affording the bird a commanding view and easy retreat in front. It was of large size, formed outwardly of sticks; it was deep and basin-shaped, and lined inwardly with the inner bark of trees and fibrous roots; and it had the appearance of having been roofed.

The Lyre bird is of a wandering disposition, and though keeping probably to the same brush, it constantly traverses it from one end to the other, from the mountain top to the bottom of the gullies. It is said to be able at one leap to pass over as much as ten feet in a perpendicular direction from the ground. It seldom takes wing, but is fond of traversing trunks of fallen trees, and frequently reaches a considerable height, by leaping from branch to branch.

Solitary in its habits, it sometimes shows a different disposition. On one occasion Mr. Gould saw two males at play; they were chasing each other round and round with extraordinary rapidity, pausing every now and then, to utter their loud shrill calls. While thus occupied they carried their tails horizontally, as they always do when moving quickly through the brush; that being the only position in which this large organ could be conveniently borne at such times.

The Lyre bird has a habit similar to that of some others, of forming small round hillocks, which are constantly visited by day, and on which the male is continually trampling, at the same time gracefully erecting and spreading out its tail, uttering its various cries, pouring forth its natural notes, mocking those of other birds, and even imitating the barking of the native dog. It has not only a loud full call, which may be heard reverberating over the gullies at a considerable distance, but an inward and varied song, the notes of which can only be heard within a few yards of the bird. This animated strain is frequently broken off abruptly, and again resumed with a low inward snapping noise, ending with an imitation of the loud and full note of the satin-bird, and always accompanied with a tremulous motion of the tail.



THE LYRE BIRD.

THE LAKE OF THRASYMENE.

The names of places become as indissolubly connected with those of individuals as with the soil to which they belong. Events in the world's history unite them by bonds of association which time only cements and strengthens. Who hears of Marathon, and forgets Miltiades? or of Thermopylæ, and keeps not in "everlasting remembrance" Leonidas and his three hundred Spartans? Who of Actium, and thinks not of Antony and the Egyptian queen? Or who, again, in future ages, will speak of Waterloo, and forget the names which have made it one of the great places of the earth? So with Thrasymene: more than two thousand years have rolled by; nations, like men, have come upon the stage of time, reached the maturity of their greatness and their glory, and then passed away for ever; but Hannibal and Thrasymene are still united. The Carthagenian hero has given to the lake an historic fame which no cycles of time can weaken or destroy. Men may give to it a new name, but the "Lago di Perugia" can never throw oblivion around "Thrasymene." Whilst the name of Hannibal remains a "household word," the scene of his victory will never be forgotten. The beauty of the sky above it, of its own calm, limpid waters, of its verdant banks, and of the picturesque towns and villages which lie scattered along its shores, will never fail to fill the mind of the traveller with admiration and delight; but the interest arising from its historic associations will surpass them all.

THE LAKE THRASYMENE.

For those who are unacquainted with the topography of this celebrated lake, we may mention that it lies in central Italy, in the province of Perugia, near the Tuscan frontier. It is nearly circular in shape, and about thirty miles in circumference, with an average depth of thirty feet. It contains three small islands, two of which are seen in the engraving, towards the north, the larger one being the Isola Maggiore; the third, called Polrese, lies at the opposite side of the lake. On the north, east, and south it is almost entirely walled in by hills, but its western coast is open, and merges into the plain of Cortona. It is fed by springs which rise from its bed, and having no natural outlet for its water, formerly overflowed its banks during seasons of rain, at which times numerous streams run into it from the neighbouring hills. To prevent the mischief occasioned by these floods, a tunnel or emissary, which is entirely cased with masonry, was made through a hill on the south-eastern bank of the lake, opposite to the island of Polrese. On issuing from this artificial channel the water flows into a canal, serving as a motive power for several mills, and after a course of two miles enters the river Caina, which is an affluent of the Nestore, which latter river empties itself into the Tiber, and thus into the sea. The best view of this magnificent sheet of water and its surrounding scenery is to be had from the hills of Spelonga, between Ossia and Passignano, on the high road from Florence to Perugia. As seen from this stand-point, its beauty can hardly be exaggerated.

Thus much, topographically, of the lake of Thrasymene: of the battle fought upon its banks, and from which all its historic interest is derived, let Polybius tell us.

"Having ascertained the exact position of the consular forces," says the historian, "Hannibal marched directly towards Rome, keeping the city of Cortona and the neighbouring hills on his left, and the lake of Thrasymene on his right. At the same time, in order to excite the wrath of Flaminius, whichever line of march he might adopt, he laid waste everything by fire and sword. Finding that the enraged consul was now rapidly approaching, Hannibal fixed upon an advantageous position, and prepared for battle. There is a large plain environed by a chain of mountains, in the centre of which is a small, but rugged and almost inaccessible hill. Behind this lies the lake, between which and the mountains runs a narrow pass leading to the inner plain. Planting his Spaniards and Africans on this hill, Hannibal stationed his Balearic and other light-armed troops on the acclivities to the right of the valley, and by placing his cavalry and Gallic forces in ambuscade along the sides of the defile, prepared a trap for the approaching army of the consul. Having thus arranged his troops, he passed the night silently and at rest. In the meantime Flaminius had been making a vigorous pursuit, and approached the lake about sunset. He encamped for the night, and early next morning prepared to lead his forces through the narrow defile which led to the Carthaginian army. The day was thick and misty, owing to a fog which rose from the lake and the adjacent mountains. When the greater part of the Roman army had passed through the defile, and its advanced guard approached near to the Carthaginian lines, Hannibal, having ordered the ambuscade to close in upon their rear, gave the signal for battle, and fell upon the Roman flanks. Thus suddenly and unexpectedly attacked on all sides, Flaminius and his troops were thrown into utter disorder; the fog thickening at this juncture increased their confusion, and rendered them unable to offer any combined or effectual resistance to the foe. Flaminius, losing all presence of mind, became unable to regulate the movements of his legions, and thus they were left entirely exposed to the fury of the enemy, who kept up a vigorous onslaught on the front, rear, and flanks of the disorganised masses of the Roman soldiery. Maddened by despair at the ruin of his army, the consul threw himself into the midst of a band of Gauls, and fell beneath their swords. Of the Roman soldiers who, though they could not fight, stood firm unto the end and made no attempt to escape, about fifteen thousand perished miserably on the plain. The fate of those who were surprised in the passage of the defile was still more miserable. Driven into the lake, some attempted to swim in their armour, but sunk under its weight; by far the greater number waded into the water as far as they could, and there endeavoured to evade the fury of the foe, but were pursued by the Carthaginian cavalry. Many were thus slain, and the remainder, preferring a less disgraceful death, put an end to their own wretched lives, after having implored mercy in vain. Of the whole Roman army only about six thousand escaped death; these, who had belonged to the vanguard of the consular army, succeeded in forcing their way through the Carthaginian lines to the hills beyond. From these they beheld the total destruction that had fallen upon their own army, and seeing that the whole plain was in possession of the victors, they endeavoured to effect a retreat to a small town in Etruria. Maharbal was despatched in pursuit, with the Spaniards and light-armed corps, and surrounding the village in which the Romans had taken refuge, he offered them their lives on condition of surrender. Overcome by their misfortunes, and placing faith in the offer of the Carthaginian lieutenant, they submitted. Thus ended the famous battle between the Romans and Carthaginians, which was fought on the banks of the lake of Thrasymene."

Such is the account given by the Greek historian of this memorable fight between the armies of the rival republics. During the battle, or rather slaughter, an earthquake is said to have taken place, but it was unfelt by the combatants. In Livy's account of the disaster, he says: "And so great was their mutual animosity, so intent were they upon the battle, that the earthquake, which levelled in great part many of the cities of Italy, which turned the course of rapid streams, poured back the sea upon the rivers, and tore down the very mountains, was not perceived by any of those who were fighting." Doubtful abstraction!

Byron makes the following reference to this incident in his Childe Harold:—

"I roam
By Thrasimene's lake, in the defiles
Fatal to Roman rashness, more at home;
For there the Carthaginian's warlike wiles
Come back before me, as his skill beguiles
The host between the mountains and the shore,
Where Courage falls in her despairing files,
And torrents, swoll'n to rivers with their gore,
Reek through the sultry plain, with legions scattered o'er,

Like to a forest fell'd by mountain winds;
And such the storm of battle on this day,
And such the frenzy, whose convulsion blinds
To all save carnage, that, beneath the fray,
An earthquake reel'd unheededly away!
None felt stern Nature rocking at his feet,
And yawning forth a grave for those who lay
Upon their bucklers for a winding sheet!
Such is the absorbing hate when warring nations meet.

* * * * *

Far other scene is Thrasimene now;
Her lake a sheet of silver, and her plain
Rent by no ravage save the gentle plough;
Her aged trees rise thick as once the slain
Lay where their roots are; but a brook hath ta'en—
A little rill of scanty stream and bed—
A name of blood from that day's sanguine rain;
And Sanguinetto tells ye where the dead
Made the earth wet, and turned the unwilling waters red.

Since that memorable disaster, which carried so severe a blow to the heart of ancient Rome, the lake of Thrasymene has never been the theatre of any great historic event; the armies which have passed along its shores have not disturbed its peace; the flight of the bird, the oar of the fisherman, the occasional songs of the villagers, busied afar at their industry, these are the only sounds which disturb the vast silence of that poetic solitude.

MAURICE RETSCH.—PEGASUS IN HARNESS.

Maurice Retsch is at the present day, if not the first, at least the most popular and most admired of the German artists. In choosing his vocation, he has followed rather the bent of his own quiet tastes, and the instincts implanted in him by nature, than the allurements of fame or ambition. His life has been essentially a quiet and retired one. Living in a pretty rural cottage, in a picturesque and romantic situation near Dresden, he seems to revel in the glorious scenery which surrounds his native town, to seek pleasure only in his home, and to practise his art merely because he himself loves it. He dwells upon a small patrimony which has been the property of his family for generations back; and having married a simple but earnest and high minded girl, the daughter of one of his father's neighbours, he seems never since to have known sorrow or disappointment. He has no children; but this has never cast a cloud over the mutual confidence and affection which have ever existed between himself and his wife; and with a charming exhibition of tasteful and delicate sensibility, on every anniversary of their wedding day he presents her with one of his own drawings. These have been all preserved in an album; and we are told by Mrs. Hall that no lover of artistic beauty, and depth of feeling and imagination, can enjoy a greater treat than an examination of its contents.

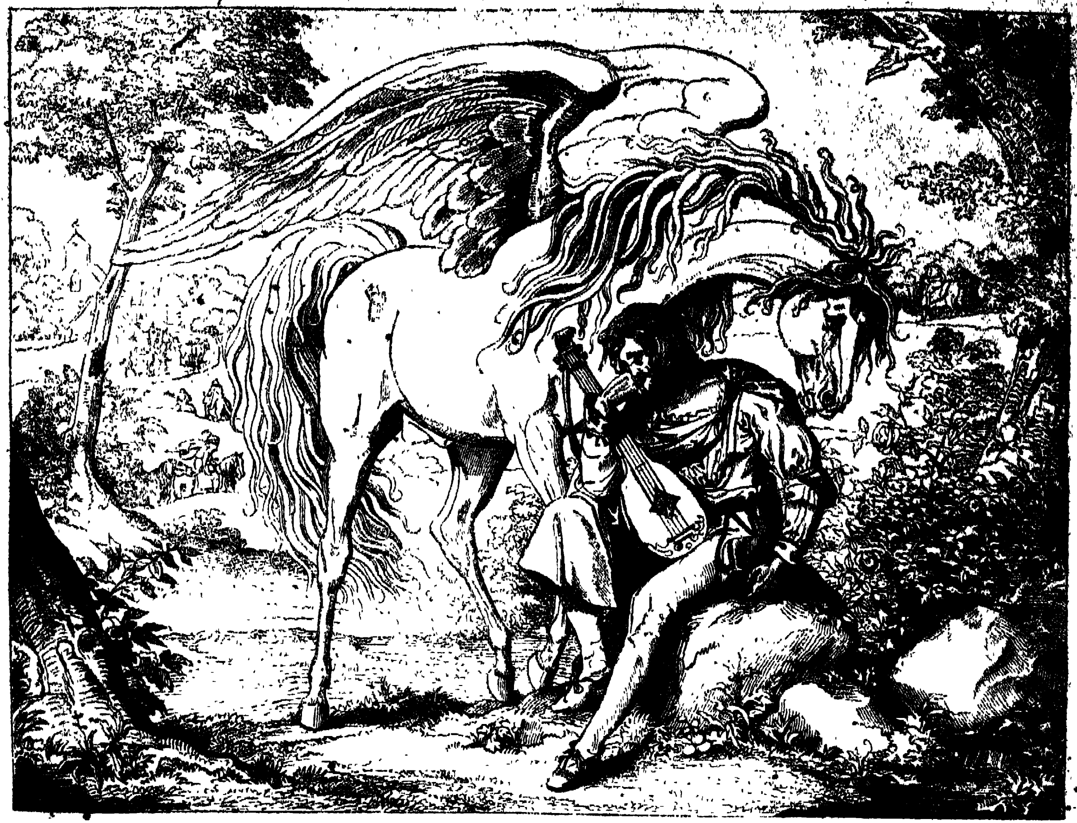
Retsch is not a painter in the ordinary sense of the word. He is more remarkable for the great breadth and truth of his conceptions, than for the elaborateness of his embodiment of them. He does not depict upon canvas with laborious minuteness all the glories of scenery, or striking traits of physiognomy. He is a designer in the highest acceptation of the word. He seldom copies anything but ideas, they may be his own, or they may be those of others, but still ideas which never before have assumed tangible, visible, proportions. All his drawings or sketches are consequently distinguished by their force and originality. Upon examining them we cannot say that they are like anything we have seen before, we cannot recognise in them any striking resemblance to any great and well known original, but we are, nevertheless, astonished by their *truth* and power. Retsch is intensely German. He has all the earnestness and depth of thought, and kindly domesticity of feeling, which characterise his countrymen, the great love of home and home enjoyments, the tender susceptibility to the influence of early associations, which prompts them to sing so loudly and so melodiously of "Fatherland," without any of the phlegmatic dreaminess and musty profundity which renders them unable to defend it against home tyranny or foreign inroads. No wonder, then, that he has entered fully and deeply into the wild but fascinating strains of Schiller and Goethe, and has marvellously realised the fantastic conceptions of their wonder-working genius. The result has been that some of his finest and most striking sketches are illustrations of their works. It would seem almost as if it had been assigned to Retsch to do with the pencil what Schiller does with the pen, so faithfully is the same idea rendered by two modes so widely dissimilar.

Schiller was not generally thought to possess any humorous talent. Most of his greatest and best known pieces are full of the wild and almost unearthly romance of passion which characterise many of Byron's works. Like the Greek tragedians he mostly portrays griefs and heights of sorrow, terrible severities, too deep and too far removed from the ordinary course of human events to evoke much of our sympathy. Like the rehearsal of the 'woes of Electra,' and the "sorrows of Hecuba," he often excites our admiration, but does not often call forth expressions of feeling. But to assert that Schiller was humorous, would, in the eyes of many, be an insult to the poet's genius. And yet many of his lighter pieces prove it. Six of what are called the *Suppressed Poems* are full of humour, but most of these were composed in youth, and we do not find that in his mature age he ever indulged in this vein except in the *Pegasus in Harness*.

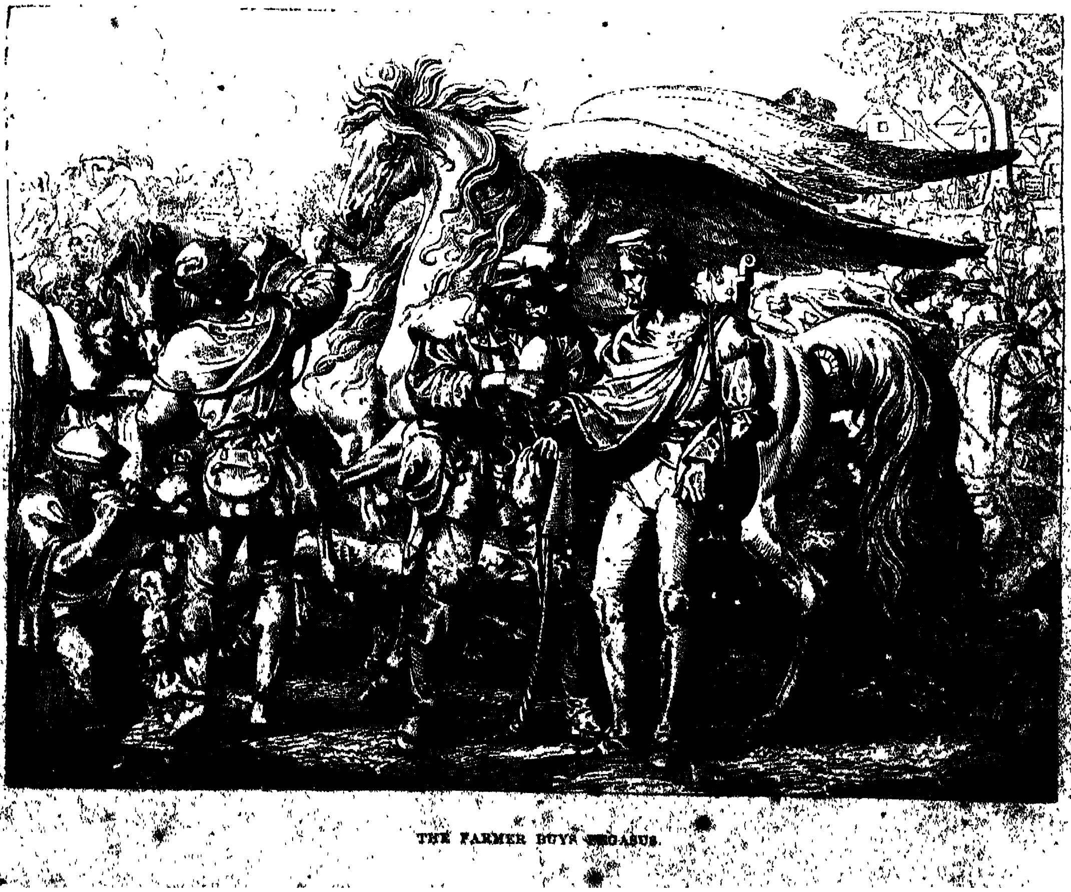
Into the spirit of this last Retsch fully entered, and we present our readers with engravings of the drawings which he made to illustrate it. Most people are doubtless already in possession of the old mythological story about the winged horse Pegasus, said to have sprung from the blood of the dragon Medusa, when slain by Perseus, how he fixed his residence on Mount Helicon, where, by striking his foot on the ground he raised the fountain Hippocrene, how he became the favourite of the Muses, and being tamed by Neptune or Minerva, was given to Bellerophon to conquer the Chimæra, and how when this monster was destroyed, Bellerophon wanting to fly to heaven, Jupiter, to punish his presumption, sent a gadfly to torment his charger, which immediately became restive and threw him, and continuing his flight to the upper regions, was finally placed amongst the constellations.

This fantastic story had furnished materials to many of the old classic poets. Hesiod, Homer, Horace, Ovid, and even Apollodorus and Lycophron the *Tenebrosus*, had all rung changes upon it, but all treated it with due solemnity, and looked at it in the sublime light. Schiller determined to handle it in the ridiculous vein, and succeeded admirably, making a German farmer purchase Pegasus at a fair, and presenting an amusing picture by showing how badly the lofty aspirations and stately capers of the celestial animal consorted with the humble duties on which his owner wished to employ him. Every one who possesses an acquaintance with any language besides his own, knows how difficult it is to preserve in a translation the delicate turns of expression, and peculiar associations from which every comic piece derives so much of its humour and raciness. An attempt has been made by E. A. Bowring to render this piece of Schiller's into English, and although it has proved by no means a happy one, still we know of no other that has succeeded so well, and we therefore present it to our readers for want of a better.

Once to a horse fair,—it may perhaps have been
Where other things are bought and sold,—I mean
At the Haymarket,—there the Muses' horse
A hungry poet brought,—to sell of course.
The hippogriff neighed shrilly, loudly,
And reared upon his hind legs proudly;
In utter wonderment each stood and cried
"The noble regal beast! But woe betide,
Two hideous wings his slender form disgrace."
"The breed," said they, "is doubtless rare,
But who would travel through the air?"
Not one of them would risk his gold.
At length a farmer grew more bold.
"As for his wings, I no use should find them,
But then how easy it is to clip or bind them!
The horse for drawing may be useful found,—
So friend, I don't mind giving twenty pound!"
The other, glad to sell his merchandize,
Cried "Done!" and Hans rode off upon his prize.
The noble creature was ere long put to,
But scarcely felt the unaccustomed load,
Than panting to soar upwards off he flew,
And, filled with honest anger, overthrew
The cart where an abyss just met the road.—
"Ho! ho!" thought Hans, "no cart to this mad beast
I'd trust. Experience makes one wise at least.
To drive the coach to morrow now my course is,
And he as leader to the team shall go.
The lively fellow'll save me full two horses,
As years pass on he'll doubtless tamer grow."
All went on well at first. The nimble steed
His partners roused—like lightning was their speed.
What happened next? Toward heaven was turned his eye,
Unused across the solid ground to fly
He quitted soon the safe and beaten course,
And true to nature's strong, resistless force,
Ran over bog and moor, o'er hedge and pasture tilled;
An equal madness soon the other horses filled.
No reins could hold them in, no help was near—
Till, only picture the poor travellers' fear!—
The coach, well shaken and completely wreck'd,
Upon a hill's steep top at length was check'd.
"If this is always sure to be the case,"
Hans cried, and cast a sorry face,
"He'll never do to draw a coach or wagon.
Let's see if we can tame the fiery dragon
By means of heavy work and little food."
And so the plan was tried. But what ensued?
The handsome beast before three days had passed,
Wasted to nothing. "Stay! I see at last!"
Cried Hans. "Be quick, you fellows! yoke him now,
With my most sturdy ox before the plough."
No sooner said than done. In union queer
Together yoked were soon winged horse and steer.
The griffin pranced with rage, and his remaining might
Exerted to resume his old accustomed flight.
'Twas all in vain. His partner stepped with circumspection,
And Phœbus's haughty steed must follow his direction—
Until at last, by long resistance spent,
When strength his limbs no longer was controlling,
The noble creature, with affliction bent,
Fell to the ground, and in the dust lay rolling.
"Accursed beast!" at length, with fury mad,
Hans shouted, while he soundly plied the lash,
"Even for ploughing, then, thou art too bad!
That fellow was a rogue to sell such trash!"
Ere yet his heavy blows had ceased to fly,
A brisk and merry youth by chance came by;
A lute was tinkling in his hand,
And through his light and flowing hair
Was twin'd with grace a golden band.
"Whither, my friend, with that strange pair?"
From far he to the peasant cried.
"A bird and ox with one yoke tied,
Was such a team e'er heard of, pray?
Thy horse's worth I'd fain essay:
Just for one moment lend him me—
Observe, and thou shalt wonders see!"
The hippogriff was loosened from the plough—
Upon his back the smiling youth leap'd now.
No sooner did the creature understand
That he was guided by a master hand,
Than 'gainst his bit he champ'd, and upward soar'd,
While lightning from his flaming eyes outpoured.



THE POET BRINGS PEGASUS TO THE FAIR.



THE FARMER BUYS PEGASUS.

PEGASUS IS YOKED IN A CART.

PEGASUS OVERTURNS THE CART.

No longer the same being, royally,
A spirit, aye a god, ascended he—
Spread, in a moment, to the stormy wind
His noble wings, and left the earth behind;
And ere the eye could follow him,
Had vanish'd in the heavens dim.

The story of Pegasus is a striking parallel to Schiller's own career. He, too, was in truth the favourite of the muses; and he, too, spurned the ordinary pursuits of every day life, that he might fly unshackled through the regions of fancy. A hymn written in childhood inspired his parents with the idea that he was peculiarly adapted for the church; the Duke of Würtemburg, his fathers's patron, wished to place him in a college which he had founded a short time previously, that he might there study the law. But young Schiller could never reconcile himself to the dry drudgery which it entailed, and soon exchanged it for medicine, not with the view of pursuing it as a profession, but as the less of two evils, one of which the wishes of his friends made necessary.

But his leisure-hours were always devoted to more congenial pursuits, and in the works of Shakspere, Klopstock, Goethe, Herder, and Gerstenberg, he found the pleasureable excitement which his more strictly legitimate occupations denied him. After taking his degree he was attached as physician to a grenadier battalion, with a small salary, and soon after published "The Robbers," the most celebrated of his works. The story was gloomy, the incidents improbable, and much of the writing fantastic. But its faults were universally acknowledged to be caused by youthful enthusiasm and inexperience, which it wanted but time to correct. The sensation it excited all over Germany was profound and lasting, and as all the petty princes of that country are bitter enemies of "sensations" of any sort, the piece met with anything but a favourable reception from the authorities. The hero being impassioned and romantic, and the captain of a band of robbers, it was alleged that great numbers of young men of respectable families were beginning to stop travellers on the highway, and demand their purses in a spirit of poetic fervour and enthusiasm. The play was, therefore, denounced as immoral, and destructive of domestic happiness. Schiller upon one occasion, surprised and delighted at the noise his work was making, paid a secret visit to Mannheim for the purpose of seeing it acted. His disguise did not save him from recognition, and on his return he was put under arrest for a week. But his high spirit could not brook the petty tyranny and annoyance of military discipline, so he took final leave of the service, and fled again to Mannheim, where he received a cordial reception from the director of the theatre, who supplied him with money for his immediate wants.

He now applied himself wholly to literature, and published works in rapid succession, the mere enumeration of which would fill a page of our space. He died in 1805, with the calm heroism of a christian philosopher. But the works he has left behind him will for ever leave a spell of magic power in his very name. His countrymen idolise his memory, and foreign nations, though seeing him through the necessarily indistinct medium of a strange language, acquiesce in the justness of their homage. What endeared him most of all to his compatriots, was the lofty character of his enthusiasm, which believed all things and hoped all things, and the chivalrous philanthropy which saw something good in all mankind. He framed for himself an ideal standard of excellence, and believed in the possibility of its attainment; he formed for his own use a mystical but symmetrical religious creed, and embraced it with all the fiery earnestness of his character. Those who differed from his opinions could not, at all events, help admiring the lofty energy and straightforwardness of him who held them. The deep spirit of poetry which pervaded his writing pervaded his life also, and this, combined with the genuine sincerity and simplicity of his character, obtained as much respect and veneration for the man, as his works secured admiration for the author. Few possessed a larger amount of these kindred feelings than Maurice Retsch, and none has given expression to them in forms so lasting. The simple-minded, tender-hearted, and enthusiastic artist could well and truly sympathise with the high-souled and ardent poet; and the same faithful pencil which assures his wife, in old age, of the lasting affection of the husband of her youth, may well link the graceful creations of a rich and glowing fancy to the immortal breathings of one of the finest geniuses of his German fatherland.

FACTS IN THE HISTORY OF ANIMAL MAGNETISM.

The history of animal magnetism furnishes some of the most remarkable illustrations on record of the influence, through the imagination, of the mind upon the body, and of the disposition in human nature which has led men, in all ages and nations of the world, to believe in the existence and agency of supernatural powers. A brief sketch, therefore, of its nature and of some facts connected with its operation, may not be without interest.

The phenomena which animal magnetism has been conceived to produce in those to whom its agency is applied, may be comprehended under two classes; those which occur whilst the person operated upon remains awake, and those which take place whilst he is asleep, or in a state resembling sleep. To the former class of effects belong, *first*, various sensations, more or less painful, experienced particularly in those parts of the body which form the seat of disease, and which enable the practitioner to detect where that seat actually is; *secondly*, convulsive and other nervous affections, which have been regarded by the advocates of this agency as salutary crises; and, *thirdly*, the removal of all diseases with which the magnetised patient may be affected, the magnetic influence proving in this respect an universal curative of disease and preservative of health.

To the second class of effects under which magnetic phenomena may be included, belongs the power which magnetised persons are said to acquire of carrying on a continued conversation with the operator, without being at all sensible of the presence of others, and sometimes in a language, and upon matters, with which, in a wakeful state, they are altogether unacquainted; the power of discovering the thoughts of others; the power of receiving through the region of the stomach those impressions of external objects which, in ordinary circumstances, are received only through the peculiar organs of external sensation, or that power which, in the technical language of magnetism, is called the transference of the senses; the power of detecting the internal changes which have been produced by disease in their own bodies, or in those of others with whom they may be placed *en rapport*; the power of foretelling the nature of the changes which are to take place in their own maladies, or in those of others; the power of instinctively suggesting the best remedies for the cure of these diseases; together with various other extraordinary powers of a similar kind.

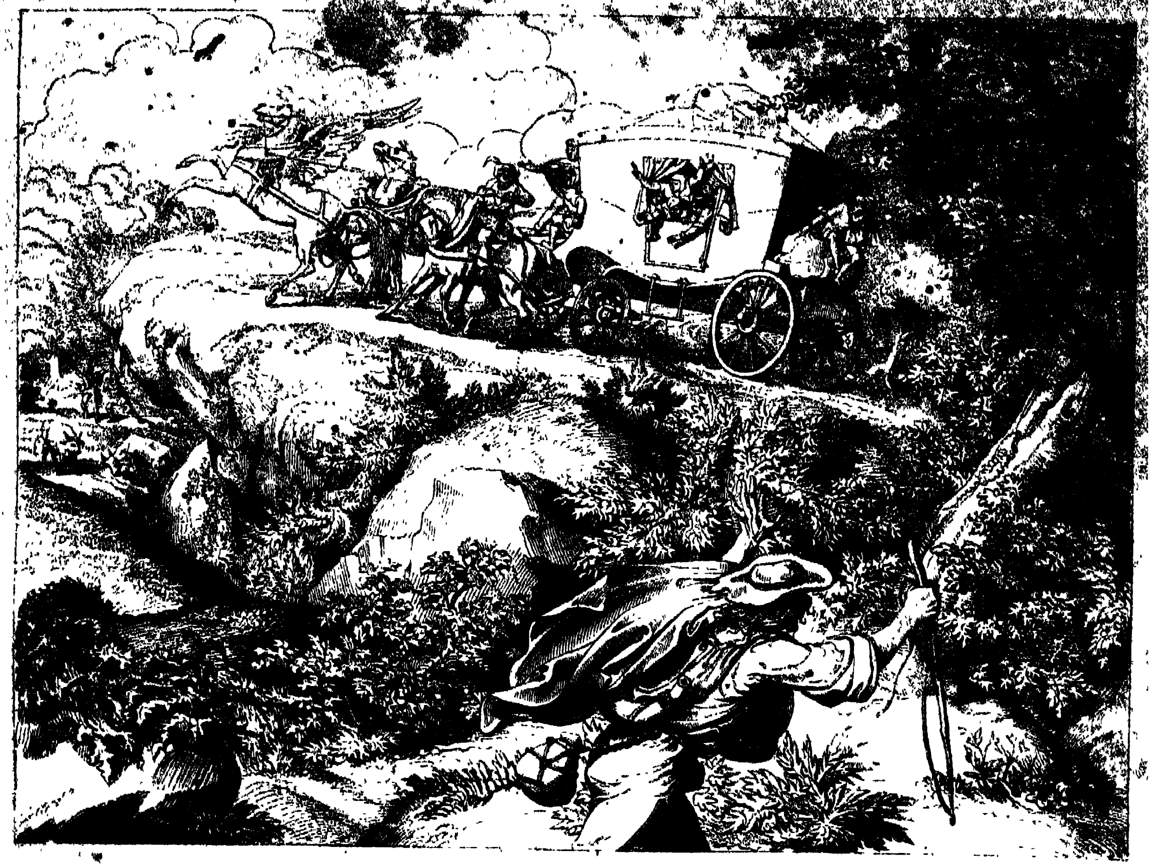
Such are the marvellous virtues attributed by its advocates to animal magnetism. To the former of these two classes of magnetic phenomena the early practitioners of this mysterious art confined their pretensions; but their modern followers extended their claims for the science to the wonderful manifestations included under the second class. In reference to the former, it may be remarked, that the singular physical properties possessed by the magnet suggested to philosophers, as early as the age of Thales (600 B.C.), the probability that it was capable of exerting some special influence upon the human system; and accordingly we find old writers ascribing to it various remarkable, but at the same time very opposite properties, some regarding it as possessed of decidedly injurious qualities, whilst others considered it as endowed with highly salutary medicinal powers. In his *Essay on Internal Diseases*, Hippocrates, the father of medicine, recommended *magnesian*, or loadstone, as a purgative; subsequently, in the days of Galen it was employed in a pulverised state for a similar purpose; and so late as the fifteenth and sixteenth centuries its use in this manner was extended to the treatment of a large class of diseases. Pulverised loadstone was likewise employed as an external application. In Pliny's time it was used outwardly for diseases of the eye, and for the cure of burns and scalds; and so on through the intervening centuries down to Paracelsus, the celebrated German physician and hermetic philosopher, who, in the sixteenth century, employed it largely as a remedy for numerous external injuries. And although Dr. Gilbert, an English physician, proved in the beginning of the following century that the magnetic properties of the loadstone were entirely destroyed in its pulverized state, the use of the powdered magnet, both as an internal and external remedial agent, continued for a century longer. Nor was the employment of the magnet in its entire state less ancient or general that that which was made of it as a powder. But this belief in its curative efficacy seems to have formed only a part of a great system, whose advocates appear to have recognised magnetism as a general power pervading the whole universe, and establishing connexion between all its various parts. It remained, however, for the celebrated Mesmer to construct out of these abstract notions of a universal magnetic influence, a regular system, which has taken his name, and which claims for animal magnetism, thus reduced to a science, all the wonderful powers to which reference has been made. These claims have been so extensively discussed, and so differently estimated, as to render useless any expression of opinion upon their merits.

Their celebrated author was born at Mersburg, in Suabia, in 1734. After studying medicine for several years in Vienna, he took his degree as Doctor of Medicine, and settled as physician in the Austrian capital. The first public announcement of his discovery of animal magnetism as a remedial agent was given by him in 1775, in a letter to Dr. Unzer, of Altona. In his *Mémoire sur la Découverte du Magnétisme Animal*, published in Paris four years later, he gives the following account of it :—"Animal magnetism is a fluid universally diffused; it is the medium of a mutual influence between the heavenly bodies, the earth, and animated bodies; it is continuous, so as to leave no void; its subtilty admits of no comparison; it is capable of receiving, propagating, communicating all the impressions of motion; it is susceptible of flux and reflux. The animal body experiences the effect of this agent; by insinuating itself into the substance of the nerves, it affects them immediately. There are observed, particularly in the human body, properties analogous to those of the magnet; and in it are discerned poles equally different and opposite. The action and the virtues of animal magnetism may be communicated from one body to other bodies, animate and inanimate. This action takes place at a remote distance, without the aid of any intermediate body; it is increased, reflected, by mirrors; communicated, propagated, augmented, by sound; its virtues may be accumulated, concentrated, transported. Although this fluid is universal, all animals are not equally susceptible of it; there are even some, though a very small number, which have properties so opposite, that their very presence destroys all the effects of this fluid on other bodies. Animal magnetism is capable of healing diseases of the nerves immediately, and others mediately. It perfects the action of medicines; it excites and directs salutary *crises* in such a manner, that the physician may render himself master of them. By its means he knows the state of health of each individual, and judges with certainty of the origin, the nature, and the progress of the most complicated diseases; he prevents their increase, and succeeds in healing them without, at any time, exposing his patient to dangerous effects or troublesome consequences, whatever be the age, the temperament, or the sex. In animal magnetism, nature presents a universal method of healing and preserving mankind."

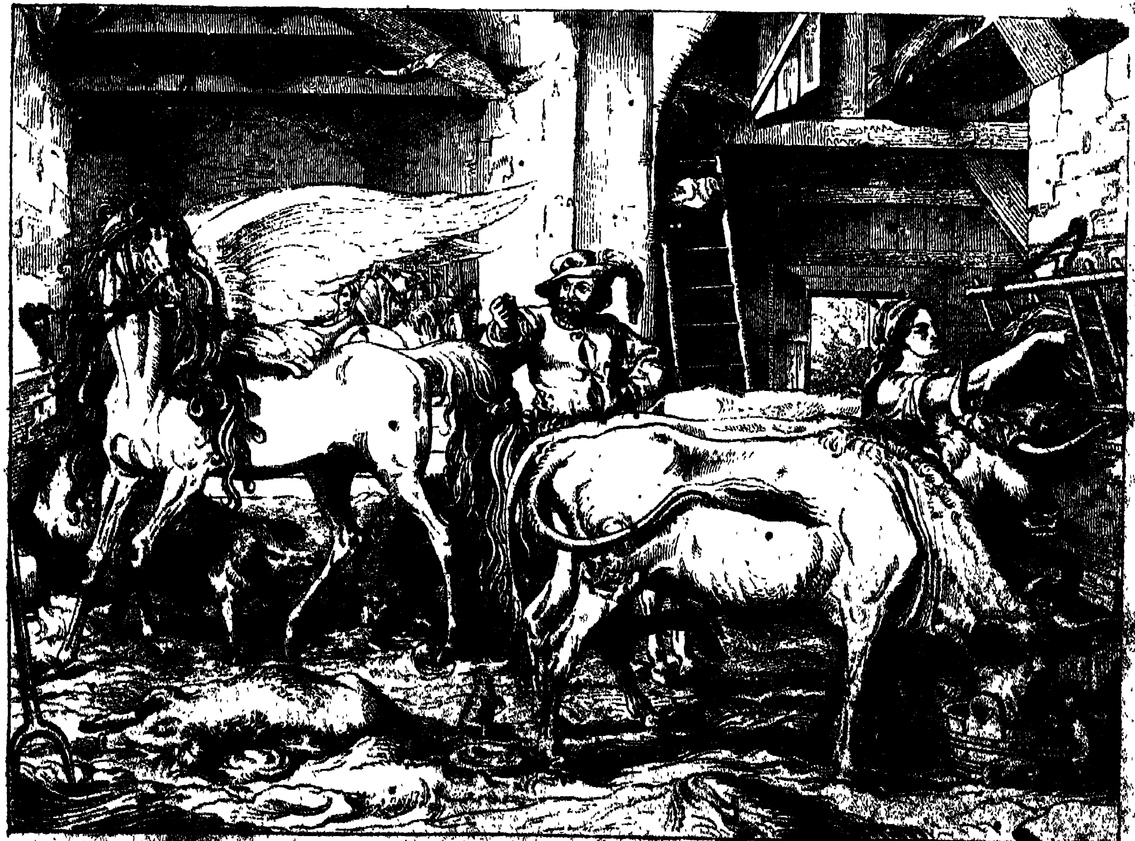
As might be expected, the announcement of this new and marvellous agent excited violent controversy. With few exceptions, all the physicians and men of science in Vienna declared it to be chimerical, and its discoverer a cheat. Thus treated, Mesmer left the Austrian capital, and after travelling for some time through various parts of Germany and Switzerland, and performing some wonderful cures, he went to Paris in 1778. On reaching this new and favourable theatre for his exploits, his first care was to procure public apartments for the treatment of his patients. Thither flocked peer and peasant in such numbers, that his rooms were insufficient for the crowds who wished to avail themselves of his universal remedy. To enter into all the particulars of his career in Paris, however, would not be in keeping with the object of this short paper. As in Vienna, so in the French capital, the faculty, with a few zealous exceptions, were unanimous in their opposition. But, supported by the influence of many patients of rank, he continued to carry out his new theory with much *éclat* and success. He propounded the principles of his system to large and applauding audiences, and illustrated their application to the cure of diseases, to the complete satisfaction of all who heard him. He applied to the government and obtained the patronage of the queen, through whose influence he succeeded in his application for a chateau and its lands, with a large yearly pension, to enable him to carry out his principles on a more extensive scale. The grant, however, was coupled with the condition that a commission should be formed by the government to examine into and report upon his proceedings. With this Mesmer refused to comply, and soon after left Paris and repaired to Spa. Thither he was followed by many of his wealthiest and most influential patients, who, on condition that he would communicate to them his doctrine and practice, bound themselves to pay him the enormous sum of ten thousand *louis d'or*. On receiving this sum, Mesmer returned to Paris, and recommenced his public practice as before; but, quarrelling with the disciples of his system, from whom he had received the sum just mentioned, he quitted France, and retired to his native place, where he died in the early part of 1815. Such is the history of the discoverer of animal magnetism, which, since his time, has more generally been called by his name.

The mode of bringing the magnetised under the influence of the magnetic fluid was peculiar. M. Bailly, who, together with Lavoisier and Benjamin Franklin, was appointed by the French government to examine into the principles of the system, gives a detailed account of the manner in which it was applied. In the middle of the room in which the patients were collected was placed a large circular vessel, made of oak, about a foot or a foot and a half in height; the interior of this vessel was filled with pounded glass, iron filings, and bottles containing magnetised water arranged symmetrically; the cover of the vessel was pierced with numerous holes, in which were placed polished iron rods of various lengths, and capable of being moved; this was called the *baquet*, or magnetic tub. Round this the patients were placed in rows, each holding one of the rods of iron, the end of which he applied to the part of his body which was the supposed seat of the disease. A cord passed round their bodies united the patients to one another, and sometimes they formed a second chain by taking hold of each other's thumbs. A piano-forte charged with magnetic fluid was placed in the corner of the room, and various airs were played upon it to put the patients into a state of quiet, and dispose them to receive the magnetic action. At some distance stood the operator, who held in his hand a polished and pointed rod of iron, from ten to twelve inches long, which served to concentrate the fluid which issued from himself, and thus render it more powerful in its action upon the patients. During this process, which consisted of various passes by the finger and rod of the magnetiser, by the application of his hands, and the pressure of his fingers on the hypochondria and on the regions of the abdomen, the patients were variously affected. Some were calm, and experienced but little effect; others coughed, spat, felt pains, local or general, and had profuse sweatings; whilst others again were thrown into violent convulsions. These convulsions were extraordinary, from their number, their duration, and their violence. All, however, were completely under the power of the operator, whose voice, gesture, or look, could immediately rouse them from whatever state they might be in.

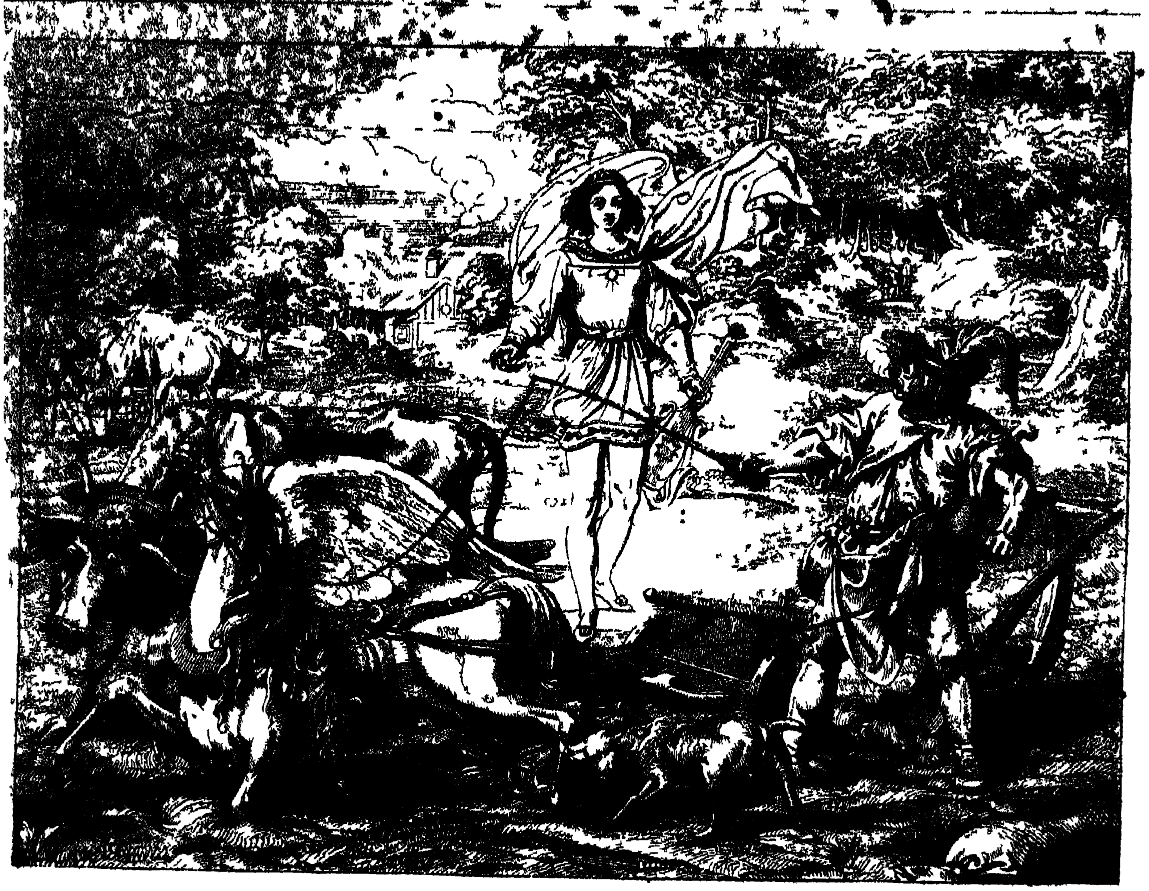
Though animal magnetism excited very great and general attention on the continent, it never thoroughly took root in England. Latterly, however, a greater amount of attention has been directed to the subject, which has been investigated by several eminent physiologists. The well known case of Miss Martineau has been the most remarkable in connexion with its history for several years. Since and before this alleged demonstration of the curative power of magnetic agency, many claims have been put forward in its favour. But whilst many of the facts recorded admit of little doubt, they have been so remarkably misrepresented through the feelings of those who have observed and narrated them, that men of science, disgusted with the imposture of some and the credulity of others, have generally shunned its investigation, and turned a deaf ear to what they consider the pretensions of its professors. It must be admitted, however, that the advocates of these "pretensions" are neither undistinguished nor few.



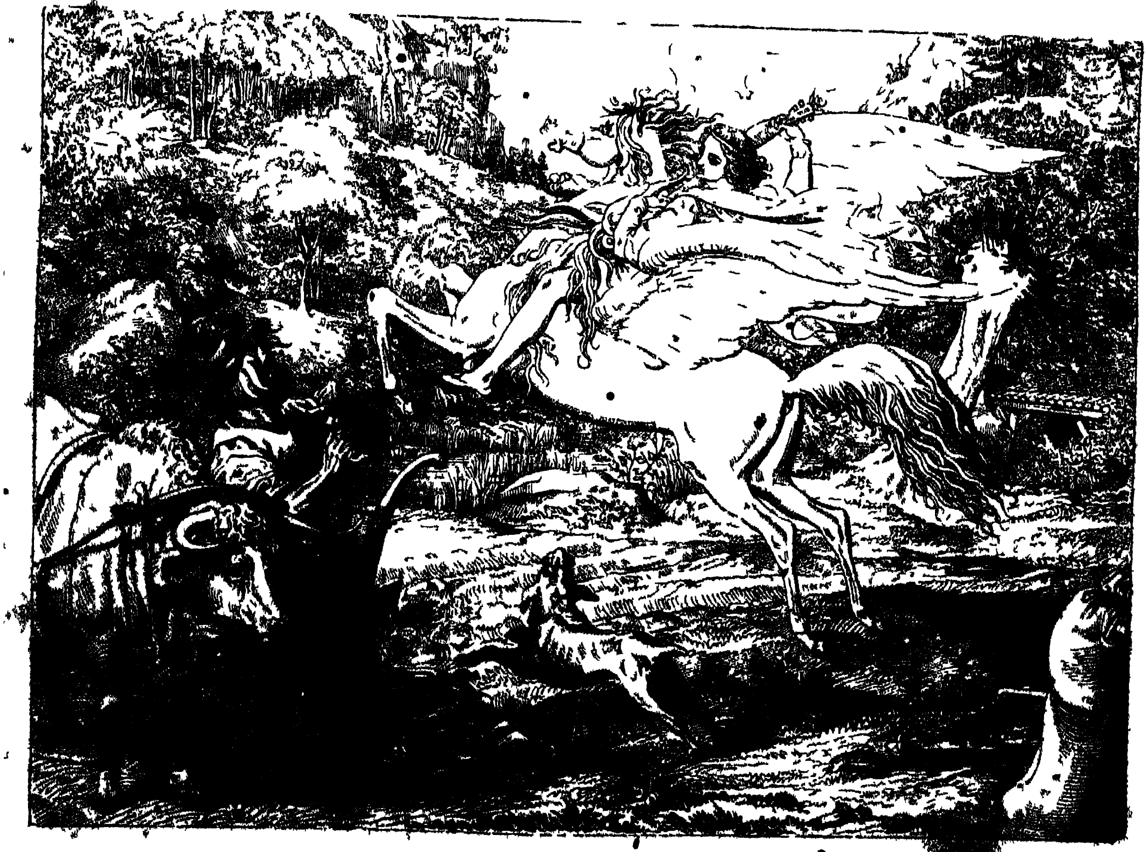
PEGASUS HARNESSED TO THE COACH.



PEGASUS BEING STARVED INTO SUBJECTION.



PEGASUS YOKED WITH AN OX



PEGASUS FLYING AWAY TO HEAVEN.

NUREMBERG, THE SCENE OF MANY ARTS.

Those who would wish to visit a city, not a little remarkable in itself, and also associated with the development and growth of many arts, should wend their way towards Nuremberg, in Bavaria. Surmounted by feudal walls and turrets, inclosed by a huge ditch lined throughout with masonry, its arched gates are flanked by massive cylindrical watch-towers, which, though no longer of use as fortifications, are highly picturesque, and serve to complete the coronet of antique towers which encircle the city as seen at a distance.

The stranger, arrived within its walls, might easily fancy himself carried back to a distant century. The physiognomy of Nuremberg is completely Gothic; in every part it has retained the aspect of the middle ages. "No two houses," says Mrs. Jameson, "resemble each other; yet differing in form, in colour, in height, in ornament, we have a family likeness; and with their peaked and carved gables, and projecting central balconies and painted fronts, stand up in a row, like so many tall, gaunt, stately old maids, with the toques and stomachers of the last century. The buildings are so ancient, the fashions of society so antiquated, the people so penetrated with veneration for themselves and their city, that in the few days I spent there, I began to feel quite old too—my mind was *wrinkled up*, as it were, with a reverence for the past. I wondered that people condescended to talk of any event more recent than the thirty years' war, and the defence of Gustavus Adolphus."

The churches and other public buildings of Nuremberg are, indeed, singularly perfect, escaping unharmed the assaults of violence in various forms, and among them, of war and siege; while its private edifices, including the palace-like mansions of its patrician citizens and merchant nobles, having been built of stone, are equally well preserved. The most elevated position within the town is occupied by the Reichsveste, or imperial castle. The shrine of St. Sebald, which stands in the centre of a fine Gothic edifice, now devoted to the Lutheran service, is the masterpiece of the celebrated artist, Peter Vischer, who, with his five sons, was employed on it for thirteen years. It is a miniature Gothic chapel, the workmanship of which is most elaborate, and is entirely of bronze, consisting of a rich fretwork canopy supported on pillars. The figures of the twelve apostles occupy the niches around the shrine, and are truly first-rate works of art; figures of the fathers of the church appear of smaller size, and various fanciful representations, distributed among flowers and foliage, are scattered over the other parts. In a niche below, at one end, is an admirable statue of Vischer himself, in the dress of a mason; and at the opposite end is a figure of St. Sebald.

Not to dwell on various matters of interest connected with this remarkable city, we must glance for a moment at the arts which have been cultivated, and are still practised there. The earliest playing cards were probably painted by means of a stencil, that is, a piece of pasteboard, or plate of thin metal, pierced with apertures, by which a figure is formed on paper, or other substance placed beneath it, when fluid colour is smeared over its surface with a brush. A rude application of wood engraving to form the outline, which the stencilling process filled up with colour, appears to have been subsequently used; it is certain, however, that the Germans were the great cardmakers of the period; and that the name by which a wood engraver is still called in Germany, *Form-schneider*, meaning figure-cutter, occurs in the town books of Nuremberg as early as 1441. Here, too, on the first discovery of printing, Hans Foltz, a literary barber and meister-singer, set up a printing press in his own house, and thus stands identified with the origin of that stupendous power which "has reformed religion, and new-modelled philosophy; has infused a new spirit into laws, and overrules governments with a paramount authority; makes the communication of mind with mind easy and instantaneous beyond example; confers a perpetuity unknown before upon institutions and discoveries, and gives those wings to science which it has taken from time."

Albert Durer, the son of a goldsmith, was born at Nuremberg, in 1471, and in early life made a great proficiency in painting and engraving. He was also skilled in anatomy, geometry, and architecture, on which subjects he composed some treatises which are extant. Many specimens of his skill as an engraver are to be found in the cabinets of collectors. The style of this artist makes no approach to classical taste, and he seems to have had no conception of ideal beauty; but he possessed an inexhaustible fertility of invention, and represented nature with an air of fidelity, strength, and majesty. He died and was interred in his native city.

In remote periods metals were beaten with a hammer to thin plates or leaves, which were afterwards divided into small slips by means of a pair of scissors, or some other instrument, and then these slips were rounded by a hammer and file so as to form threads or wire. So long as the work was thus performed, the artists at Nuremberg were called wire-*smiths*; but Rudolph, a native of that city, is said to have constructed a famous machine for drawing wire, after which they were called wire-*drawers*, or wire-*millers*, and both these appellations occur in the history of Nuremberg as early as 1360.

The first portable fire-arms were discharged by means of a match, which, in the course of time, was fastened to a cock, for the greater security of the hand while shooting. Afterwards a fire-stone was screwed into the cock, and a steel plate or small steel, which could be cocked or wound up by a particular kind of key, was applied to the barrel. The invention of the lock was, therefore, a manifest improvement in these weapons; it is traced to Nuremberg, in 1517, and was, most probably, a very rude affair compared with the locks which have been subsequently contrived. Cannon are said to have been cast here so early as 1356. This city was, in fact, the continental Birmingham for many ages, during a portion of which period it is said to have had 70,000 inhabitants.

"But," says Mrs. Jameson, "what is most striking and curious in this old city is to see it stationary, while time and change are working such miracles and transformations everywhere else. The house where Martin Behaim, four centuries ago, invented the sphere, and drew the first geographical chart, is still the house of a mapseller. In the house where cards were first manufactured, cards are now sold. In the very shops where clocks and watches were first seen, you may still buy clocks and watches. The same families have inhabited the same mansions from one generation to another, for four or five centuries. The great manufactories of those toys called Dutch toys, are at Nuremberg. The enormous scale on which this commerce is conducted, the hundreds of wagon loads and ship loads of these trifles and gimcracks which find their way to every part of the known world, must interest a thinking mind. A Nuremberger complained to me most seriously of the falling-off in the trade of *pill-boxes!* He said that since the fashionable people of London and Paris had taken to paper pill-boxes, the millions of wooden or chip-boxes which used to be annually sent from Nuremberg to all parts of Europe were no longer required, and he computed the falling off of the profits at many thousand florins."

LITERARY FORGERIES.

One of the most remarkable of this class of deceptions which occurred during the last century, was that perpetrated by the *soi-disant* George Psalmanazar. His career forms one of not the least interesting curiosities in the history of literature. He was a Frenchman by birth, and had been educated in a college of Jesuits, which he left to become tutor to the son of a nobleman. He soon fell into bad habits, however, which obliged him to leave his situation and turn his attention to something else. Having procured a certificate that he was of Irish descent, and that he had left the country for the sake of the Roman Catholic faith, he prepared to make a pilgrimage to Rome. But being unable to purchase the necessary garb, and observing one in a chapel, dedicated to a miraculous saint, he contrived to appropriate the garment. Thus disguised, he begged his way in fluent Latin, with such success that on the very first day of his pilgrimage he had procured a considerable sum of money. In this manner he travelled through a great part of the continent. During his early residence among the Jesuits, he had heard them speak much of China and Japan, and whilst in Germany he conceived the design of personating an islander of Formosa; what he wanted in knowledge to carry out his scheme, he supplied by a pregnant invention. His first step in the imposture was to form a new character and language on grammatical principles, which, like other Oriental languages, he wrote from right to left. He then planned a new religion, and a division of the year into twenty months, with other novelties, to give colour to his pretensions. To give the greater consistency to his imposture, he worshipped the rising and setting sun, and ate raw flesh, a custom which still better assisted his deception than even the one just mentioned. In a garrison at Sluys he found a Scotch regiment in the Dutch pay, and was introduced by the colonel to the chaplain, who, with the view of recommending himself to the Bishop of London, resolved to carry him over to England, and effect his conversion. The bishop received the impostor with the most credulous humanity, and Psalmanazar formed a large circle of friends who extolled him as a wonder. Innes, the chaplain, soon after received a living from the shortsighted bishop, and afterwards gave himself no further trouble about the spiritual welfare of the Formosan. The pretensions of the latter were not universally admitted in England; there were many doubters, amongst the most learned of whom may be mentioned, Drs. Halley, Mead, and Woodward. The impostor, however, was employed by his patrons to translate the Church Catechism into the Formosan language, which was examined by the learned, approved, and laid by as a valuable manuscript! His next production was "An Historical and Geographical Description of Formosa, with Accounts of the Religion, Customs, and Manners of the Inhabitants, by George Psalmanazar, a native of the said isle," 1704; with numerous plates of their dress, religious ceremonies, their tabernacles and altars to the sun, moon, and the ten stars, their architecture, the governor's castle, a temple, a city house, a country house, and the Formosan alphabet. In his conferences before the Royal Society with a Jesuit just returned from China, the Jesuit had strong suspicions that our hero was an impostor. The priest held to the conviction, but could not satisfactorily communicate it to others; and the unblushing Psalmanazar, after politely asking pardon for the expression, complained that the Jesuit "*mentitur impudentissime*" (lies most impudently).

The zealous believers in his *genuineness* sent him to Oxford to study what he liked, whilst they learnedly contended with his opponents in London upon the merits of his catechism and history. Dr. Mead insisted that he was a Dutchman or a German; some thought him a Jesuit in disguise, the catholics declared him to be a tool of the protestants bribed to expose their church; whilst the presbyterians discovered that he was paid to explode their doctrine and cut up episcopacy. *Sic stulti omnes.* The bubble at length burst; a minute examination of the "History" led to a complete *exposé* of the whole delusion, and its author composed his autobiography as the penance of contrition, not to be published till after his death, when all human motives for further imposture would have ceased. The book is tedious, but curious, as showing the progress of the mind in an ingenious and sustained deception. Psalmanazar lived several years after the discovery of his trick, and was concerned in several works of credit, particularly the well known Universal History. He died some time in the year 1763.

MANUFACTURE OF MEAT BISCUIT.

This Meat Biscuit, which attracted much attention at the Exhibition, and to the inventor of which (Mr. Gail Borden, of Texas, U.S.) a Council Medal was awarded, is made as follows:—Beef, mutton, or other flesh, in good condition, is boiled in a quantity of water until all its nutritious or alimentary properties are given out in the decoction; the fat and oily matter which rises to the surface is removed by skimming, after which the decoction is strained off and allowed to settle. The clear liquor is next poured off and evaporated in a vacuum pan or other suitable vessel, to the consistence of thick treacle. With this soft extract of meat, a sufficient quantity of either flour, meal, or powdered biscuit is added, as will form a dough of sufficient stiffness to be rolled into a convenient form and cut into biscuits, which are then carefully baked; the heat of the oven used for this purpose being about that of a common oven after a batch of bread has been baked in it.

These biscuits may be kept in that form, or be ground into meal for the greater convenience of cooking; in which state it should be kept in air-tight bags of gutta percha, varnished cloth, or other material capable of keeping out the air, water, and moisture.

To prepare soup, the meal or ground biscuit is first stirred with a sufficient quantity of cold water to form a thin batter, in which it may stand from five to twenty minutes, when boiling water is added, and the whole boiled from ten to thirty minutes, according to the firmness of the biscuit meal used, and until it is dissolved in the water. Salt, pepper, or any other condiment may be added to suit the palate. Also cooked vegetables of any kind. One ounce of biscuit will make a pint of soup.

In the manufacture of the biscuit, about two parts of meat extract are mixed with three parts of flour: the dough loses about 20 per cent. in the baking.

The inventor states that the meat biscuit is not liable to the attacks of the weevil or other insects.

In some of our colonial possessions, as Australia, &c., these biscuits may be made at a very low price, as, in addition to abundance of animal food, the finest wheat in the world is there grown.

The advantages attendant on the use of the meat biscuit are so self-obvious as scarcely to require pointing out. For all enterprises whether of war or peace, of commerce or science, the meat-biscuit is eminently adapted; furnishing ample nourishment, so small in bulk, and so light in weight as to admit of easy transport. Experience has shown, that although human life may be sustained on a diet of a simple kind, the highest degree of corporeal and mental strength can be maintained only by the use of both vegetable and animal food, especially when labour, fatigue, and privation are to be undergone. In the meat-biscuit this combination is obtained in the most satisfactory condition.

THE LADIES' DEPARTMENT.

CROCHET POINT EDGING,

SUITABLE FOR TRIMMING INFANTS' ROBES, &c.

Materials.—Crochet Cotton, No. 24, Crochet Hook, No. 21.

Make a chain of the required length, reckoning the number of stitches by seventeens, with 3 over in the length. Do one row of s.c.

2nd row: × 1 d.c., 1 ch., miss 1, × throughout the length, end with 1 d.c.—3rd: S.c.

4th: × 3 s.c. (taking up both sides of the chain), 7 ch., miss 3, 3 s.c. as before, 7 ch., miss 3, 2 s.c. as before, 7 ch. miss 3, × repeat as often as required; end with 3 s.c.

5th: × 3 slip on 3 s.c., 5 s.c. under the chain of 7, make a picot thus: 2 ch., miss 1, slip on next, slip on last s.c., 5 s.c. under chain; 3 slip on 3 s.c., 3 s.c. under loop, make a picot, 7 more s.c. under loop, miss the 2 s.c. of last row, 5 s.c. under next loop, turn the work on the wrong side, 7 ch., s.c. under the second and third from the picot of the loop just completed; turn on the right side, 5 s.c., under the chain just made, 1 picot, 5 more s.c. under the same chain; now finish the loop already begun with 2 s.c. under the chain, 1 picot, 3 more s.c. under the chain, ×.

Repeat throughout the length, ending with 3 slip on 3 s.c.

CROCHET EDGING.

Materials.—For children's drawers, and other fine articles, Crochet Cotton, No. 24, Crochet Hook, No. 22. For petticoats, Crochet Cotton, No. 16, Crochet Hook, No. 18.

Make a chain of the length required, the number of stitches in it being divisible by 7, with 3 chain over, if a straight piece. If intended to be formed into a round, it is better to do so at once.

2nd row. S.c. in every chain.

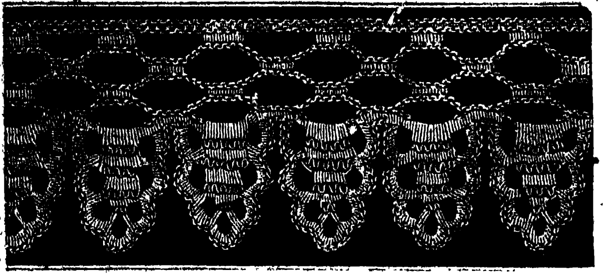
3rd: × 3 s.c., 7 ch., miss 4, × repeat.

4th, 5th, and 6th: 3 s.c. on 3 centre of the 7 ch., × 7 ch., 3 s.c. on 3 centre of the next loop, × repeat.

7th: × 3 s.c. on 3 s.c., 8 d.c. under chain of 7, 1 chain, *turn*, 7 s.c. on the 8, inserting the hook in both sides of the chain; *turn*, 1 ch., 6 s.c. on 7; *turn*, 1 ch., 5 s.c. on 6; *turn*, 1 ch., 4 s.c. on 5; *turn*, 1 ch., 3 s.c. on 4; *turn*, 1 ch., 2 s.c. on 3; *turn*, 1 ch., 1 s.c. on 2. Turn on the right side, and do s.c. down from the point to the base of the vandyke, × repeat.

Observe that in working this vandyke all the stitches are taken under both sides of the chain.

8th: S.c. on centre of 3 s.c., × 5 ch., s.c. at the side of the vandyke, under the 1 chain after 6 s.c., 5 ch., s.c. under 1 ch. after 3 s.c., 5 ch., s.c. under the point, 5 ch., s.c. in the same place, * 5 ch., s.c. to correspond with the loop on the other side of the vandyke, * 3 times, × repeat.



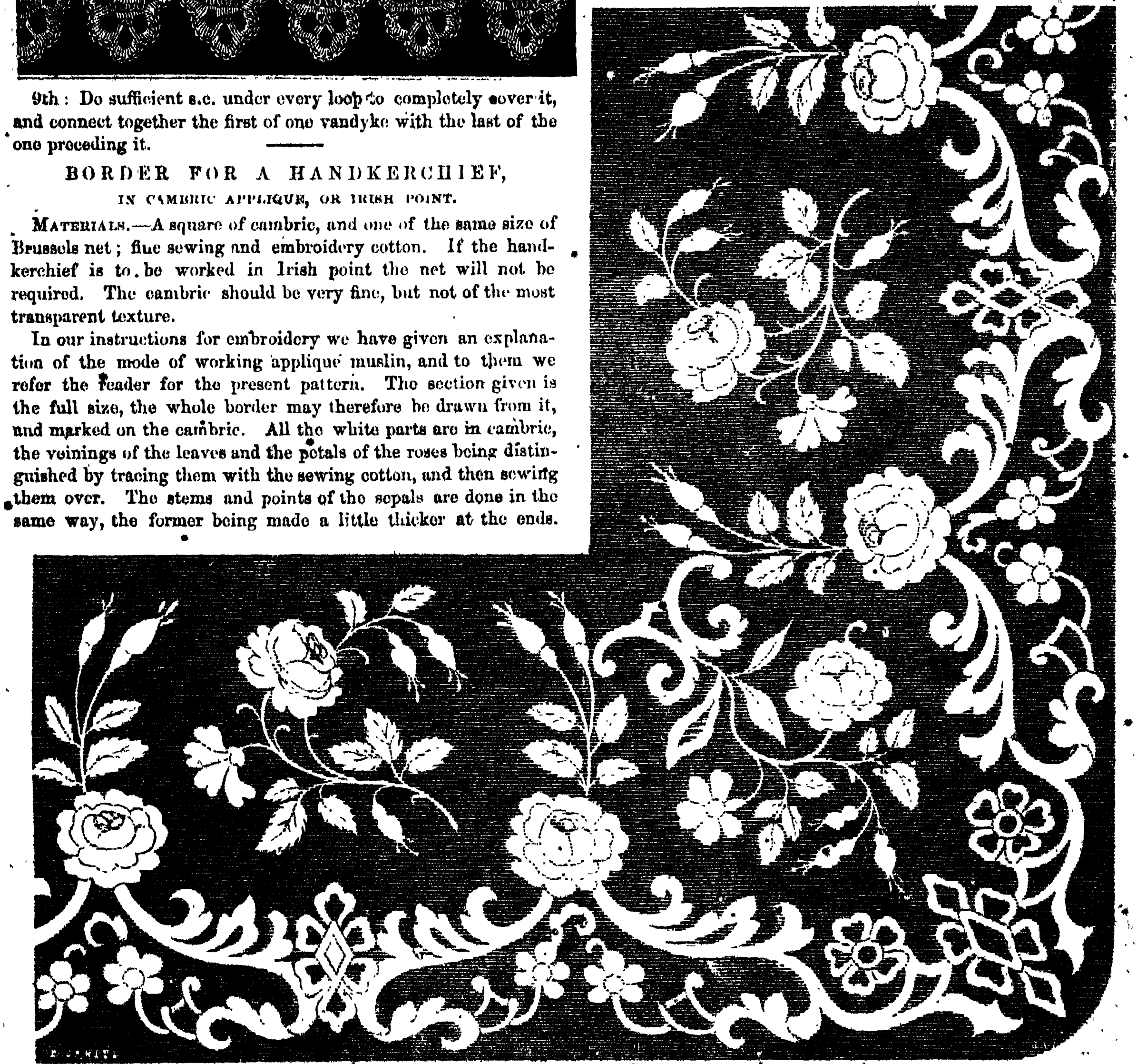
9th: Do sufficient s.c. under every loop to completely cover it, and connect together the first of one vandyke with the last of the one preceding it.

BORDER FOR A HANDKERCHIEF,

IN CAMBRIC APPLIQUE, OR IRISH POINT.

MATERIALS.—A square of cambric, and one of the same size of Brussels net; fine sewing and embroidery cotton. If the handkerchief is to be worked in Irish point the net will not be required. The cambric should be very fine, but not of the most transparent texture.

In our instructions for embroidery we have given an explanation of the mode of working appliqué muslin, and to them we refer the reader for the present pattern. The section given is the full size, the whole border may therefore be drawn from it, and marked on the cambric. All the white parts are in cambric, the veinings of the leaves and the petals of the roses being distinguished by tracing them with the sewing cotton, and then sewing them over. The stems and points of the sepals are done in the same way, the former being made a little thicker at the ends.



In muslin appliqué the groundwork is net; in Irish point it is formed of bars covered with button-hole stitch, connecting all the various parts; and in both styles of work two parallel rows of sewing, over a thread about the eighth of an inch apart, divide the border from the centre of the handkerchief. The outer edge of the work is finished by a row of very fine button-hole stitch, and a pearl edging.

If worked in appliqué, those parts of the net which are left in the edge of the border, within the scrolls, should be worked in fancy stitches; and the same parts may be filled with English lace, or other point stitches, for Irish point. The heart of every rose should be open, having a single spot of English lace in it, and care should be taken to follow nature as closely as possible in the formation of the leaves and buds.

Five perfect patterns on each side, besides the [illegible], will be a very good sized handkerchief.

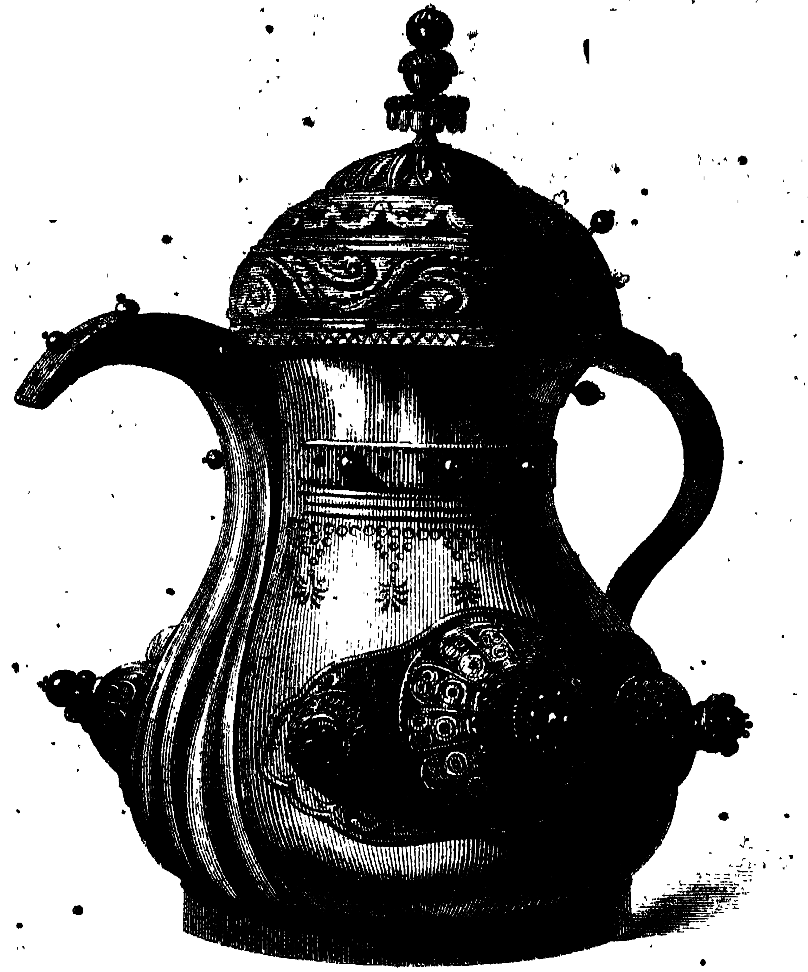
DIRECTIONS FOR ENLARGING PATTERNS.

As the pages of our magazine will not admit of all the needlework patterns being given of the full size, and it is requisite that the worker should enlarge them for herself, an explanation of the mode of doing this with accuracy mry be acceptable. A very slight knowledge of drawing will enable any one to do this.

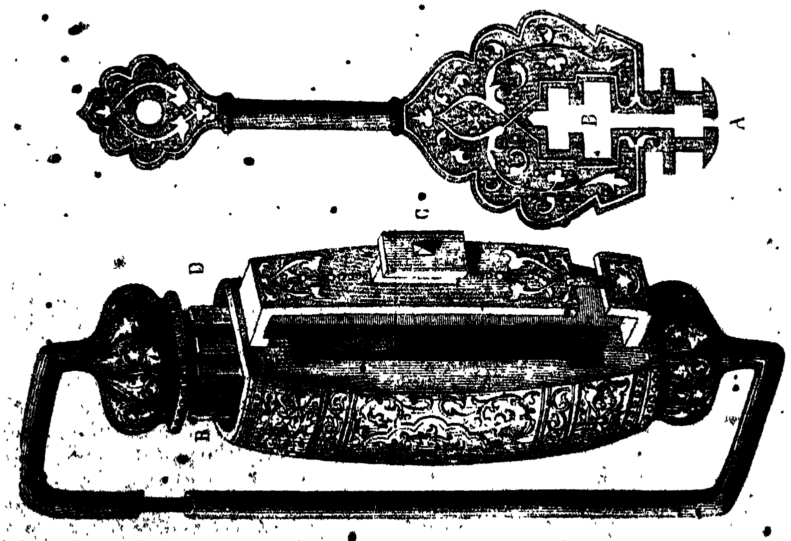
Trace the patterns from the engraving on thin writing-paper, and then rule lines with a pencil, dividing it into sections, both in the length and width. Should the design be a very elaborate one, the lines should be proportionably numerous: the pattern may have eight or more lines each way, but if it is simple four will probably be sufficient. Then mark or cut out the shape of the article in white paper, the *full size*, allowing for turnings in, &c., and within the shape draw the same number of lines, at equal distances, as are in the smaller pattern. There will then be little difficulty in sketching the design, with a pencil, the full size, as with these lines to guide you, you will easily manage that each leaf and scroll shall come in its proper place, if you take care that it is in the same position on the large pattern that it holds in the corresponding section of the engraving.

By carefully following this plan, a pattern may be increased to any size desired; the shape of the full-sized article should, however, be marked with great accuracy, particularly in gilets, collars, and other similar things, which are intended to fit well.

DOMESTIC ART AMONGST THE TURKS AND ARABS.



COFFEE POT OF THE SULTANA VALIDA.



CURIOUS ARABIAN PADLOCK.

Arabic art had no existence before the time of Mahomet, and it was only when the followers of the prophet found themselves in contact with the Sassanides and the Greeks that it took its rise. The Arab chiefs borrowed from the natives of the civilised countries whose neighbours or masters they had become. This is acknowledged by the oldest Arab authors. One of them, Eben Khaldoron, thus expresses himself upon the subject: "We always see that nomade tribes, amongst whom civilisation has not yet commenced, are obliged to have recourse to other countries in search of persons skilled in the arts." But, as might be expected, amongst a people so imaginative and intelligent, it was not long before native artists began to rise into notice, and a style soon sprung up which has ever since been known as *Arabic art*, or Arabesque, properly so called, and which prevailed for a long time, not in the East only, but in some countries of Western Europe. It is remarkable for its richness in curious combinations, based generally upon geometric lines arranged in a very complicated but ingenious manner; and it displays itself upon even the smallest domestic utensils, upon their furniture, bindings of books, every sort of embroidery, and in the decorations of almost all private houses.

The padlock and key, of which we give engravings, may serve to furnish a good idea of the taste in ornament, as well as the mechanical ingenuity, of the Arabs. The key is held in a horizontal position, and is introduced into the lock at the aperture A; its point, marked A also, entering first. A bar of iron placed behind the outer plate enters the wards of the key as far as B. The key is then raised so as to make it pass the elevated parts indicated by C. A pressure is thus exerted upon the springs in the interior, the ends of which are visible at B and D, and the upper part is allowed to rise, and the curved bolt is withdrawn from its sheath. A lock of precisely similar construction to this one is preserved in the Musee des Thermes at Paris. It is undoubtedly of Arabian workmanship, but is deprived of its ornaments, the place of which is supplied by bands of copper inlaid with iron.

The Turks, as well as the Arabs, drew the first ideas of art from the Byzantines, upon whom the Asiatic style had already exercised considerable influence, as is evidenced in all their works of an early period. Since the seventeenth century Turkish art has undergone very considerable modifications, which may, perhaps, be attributed in some measure to their wars and frequent intercommunication with Germany and Poland, but in a still greater degree to Sultan Othman, who sent artists to study in the west, but at one of the worst periods that could have been chosen. The Turkish taste was thus completely bastardized by the introduction of the rockwork and devices in shell, which appeared on nearly all ornamental works of European manufacture during the eighteenth century.

The other engraving represents a domestic utensil, and by comparing it with the lock we may form some idea of the slight differences of style which exist between the works of the Turks and Arabs. It is a tea-kettle or coffee-pot, and was found in the tomb of the Sultana Valida, mother of Mahomet IV., who reigned in the middle of the seventeenth century. It is made of copper, with golden filagree work around the sides, surmounted by grains of carved coral. The same plan prevails throughout, and all the ornamental parts are executed with the utmost delicacy.

The discovery of this vessel in the tomb reminds us of the custom which prevailed among the ancients of placing beside the dead whatever had been most useful or most loved in life. It was evidently employed in heating a liquor of some sort, as the most prominent of the corals bear traces of the action of fire.

LITHOGRAPHY.

The process depends upon the facility with which some kinds of stone absorb either grease or water, and on the natural antipathy which grease and water have for each other. An even surface having been given to the stone, a drawing is made upon it with a greasy chalk. The stone is then wet, and the printer passes over it a roller, covered with printing ink, which adheres to those parts only which are drawn upon with the chalk; a damp paper is then pressed upon it, and receives an impression of the drawing. Lithography was accidentally discovered by Alois Senefelder, the son of a performer at the Theatre Royal of Munich. He was a student of law at the University of Ingolstadt, and after his father's death tried a theatrical life, but without success. He then became an author, but being too poor to publish his work, tried various methods of writing on copper, in order that he might then print himself, and soon found that a composition of soap, wax, and lamp-black, formed an excellent material for writing, capable, when dry, of resisting aquafortis. To obtain facility in writing backwards, as copper was too expensive, he procured some pieces of calcareous stone, which, when polished, served him to practise upon. His mother having one day desired him to take an account of some linen she was sending to be washed, he wrote it out on a piece of this stone with his composition of soap and wax. It afterwards occurred to him, that by corroding the surface with acid, the letters would stand out in relief, and admit of impressions being taken from them. He tried the experiment, and succeeded, and soon found that it was not absolutely necessary to lower the surface of the stone, but that simply wetting it was sufficient to prevent the printing ink from adhering to any parts except those marked with the composition. Such was the invention of lithography, and Senefelder continued to pay unremitting attention to the improvement of the art. In 1796 pieces of music were printed, and it was perhaps the first time that lithography became of real use. The difficulty of writing backwards brought about the invention of the transfer paper. In 1799, Senefelder took out a patent at Munich, and soon after entered into partnership with a Mr. Andre, of Offenbach, who proposed to establish presses and take out patents in London, Paris, and Vienna. He came to London in 1801, with a brother of Mr. Offenbach, and communicated the new art, then called poly-autography, to many of our best English artists, who tried it; but the continual failures through want of skill in the printing, and the difference between German and English materials, caused it to be abandoned. Having separated from Mr. Andre, Senefelder went to Vienna, where he tried to apply lithography to the printing of cottons, but apparently without success, and he returned to Munich in 1806; in which year the professor of drawing at the public school of Munich, Mr. Mitterer, succeeded in multiplying copies of his drawings for his pupils by lithography. He is also said to have invented the composition for chalk as now made. In 1809, we find Senefelder inspector of the royal lithographic establishment at Munich, and engaged in printing a map of Bavaria. He soon after invented the stone paper, which, however, did not succeed; it was exhibited in 1823 at London, by a partner of Senefelder, but its liability to crack by being wet, and the pressure of the press, rendered it useless. Little was done in England after 1806, till its revival in 1817, since which time it has been gradually improving, till lately it has acquired still greater powers by the means of employing a second stone, by which is obtained a perfect imitation of drawings made on tinted paper, having the lights laid on with white.

WHIMSICAL IDEAS ABOUT HOMER AND THE TROJAN WAR.

Strange as were some of the notions held by ancient grammarians on points of philological dispute in the poems of "the blind old man of Scio's rocky isle," their criticisms have been far surpassed in absurdity by some of their modern followers.

In 1658, a book, called *Homerus Hebraizon*, was published by Zachary Bogan, an English philologist, in which he attempted to draw from the "Iliad" and "Odessey" convincing evidence of the truth of the Mosaic histories. Two anonymous critics "followed on the same side," endeavouring to establish his theory in two works, called *A Discourse, in the form of a comparison between the lives of Moses and Homer*; and *Homer the Historian of the Hebrew people*. Next followed the celebrated work of Crœsus, *Homeros Hebraios*, published at Dordrecht, in 1704. He plainly asserted, and proved to his own satisfaction, that the "Odyssey" was neither more nor less than a history of the Israelites under the patriarchs.

Bryant, an English antiquary, who died in 1804, had maintained in one of his early works, called *An Analysis of Ancient Mythology*, that the histories of the patriarchs, as given in the Old Testament, had been the sources whence most of the old pagan mythology had been drawn; and in 1796, published his *Dissertation on the Trojan War*, as described by Homer, in which he affirmed that this expedition had never taken place, and that the pretended city of Phrygia never had an existence. He maintained that Homer had been born at Thebes, one of the two capitals of Egypt, and pretended that he had been a superstitious poet, who, after having grown old on the banks of the Nile, had stolen the poems of Phantasia from the temple of Isis, and changed the scene to Troy, disguising under Grecian names the gods and heroes who had figured during the monarchy of the Pharaohs. According to this hypothesis, then, Homer and his works belonged to the east; but Vincent Coco, a Neapolitan, who died in 1823, imagined that the great poet's songs, far from being of Greek origin, as the general belief has so long been, originated altogether in Italy.

Grave, a Flemish writer, who died about the beginning of the present century, was equally anxious to gain the credit of the poems for his own country; maintaining that the events of the Trojan war had all occurred in the neighbourhood of Amsterdam. He seriously developed his theory in three octavo volumes, which he published in 1803. In these curiosities he endeavoured to prove that an ancient republic had existed on the northern banks of the Rhine, where Ulysses and all the other celebrities of the Trojan war, and subsequently those of the "Odyssey," had performed what has been attributed to them by Homer and Hesiod, both of whom he makes of Belgian origin. He gives to this people the name of *Elysians*, "who according to other accounts, were called *Atlantes*, *Hyperboreans*, and *Cimmerians*," and affirms that twelve or thirteen centuries before the Christian era, they had reached a most advanced state of civilisation, and cultivated philosophy, and the arts and sciences, to a very remarkable extent. His vagaries were adopted and advocated by a Dr. Davies, in a work called *Celtic Researches*, published shortly afterwards.

ARABESQUES.

The graceful, but heterogeneous, species of ornament thus designated, derived this modern name from the Spanish Arabs, those brilliant children of the East, who were so far in advance of all their continental neighbours, both in literature and art, and whose dominion forms so stirring and romantic an episode in European history. But this style of decoration existed long before ever the turbaned warriors of the Prophet set foot in Spain. Specimens of it are met with in numerous remains of Grecian and Roman art at the present day, and there is abundant proof that its origin is still more remote. Virtuvius, with much probability, traces its invention to the earliest *praticiens* of nearly all science and art, the Egyptians, and finds the first developments of the idea in the hieroglyphical monuments on the banks of the Nile At the fall of the Roman empire arabesque decorations shared in the almost universal neglect of the fine arts, and are hardly to be met with in any of the Christian buildings erected about that retrograde period. But when the enthusiastic and victorious followers of Mahomet came forth from their native deserts to conquer and proselytize the world, they opened up even the current of suspended civilisation, and cultivated the various branches of science and art with a vigour which the rude asceticism of their Christian contemporaries could neither feel nor practise. The dogmas of their religion, however, strictly forbade the representation of animals of any kind, in order to avoid the very semblance of idolatry; the adoption, therefore, of this species of decoration for their paintings and sculptures at once satisfied the restrictions of the Koran, and provided a field for the practice of the fine arts. Without violating any injunction of their religion, they could here embody the creations of their brilliant eastern imaginations in every variety of graceful and fantastic combinations of fruit and flowers. With these they painted and sculptured the surface of their buildings. The grand mosque of Cordova, and the Alhambra of Granada, contain many specimens of these Arabic decorations, which even yet, after the lapse of centuries, have lost but little of their original exquisite brilliancy of colour or clearness of outline. In these two qualities they far surpass all other specimens of this branch of art which were executed by any of the other European nations who flourished at the same time. The arabesque compositions of Christian artists, however, in addition to vegetable forms, were made to include animals of every kind, whether real or imaginary; hence, in time, all fanciful combinations of natural objects, of whatever kind, which were employed for the continuous decoration of a flat surface, came to bear this designation. The name, indeed, has now become so general as to be applied to the strange enrichments found on the walls of Herculaneum and Pompeii, as well as to others of the same and earlier date, which were formed and forgotten long before the sons of Ishmael had learned to draw. The most celebrated arabesques of modern times are those with which the prince of painters ornamented the arcaded gallery of the Vatican, which bears his name. Though only one of the three sides of this gallery, or rather galleries, for it is in three lengths, exhibits the designs of the great artist himself, they are always distinguished as *Le Logge di Raffaelle.*

MONT BLANC.

"Above me are the Alps,
The palaces of nature, whose vast walls
Have pinnacled in clouds their snowy scalps,
And enthroned eternity in icy halls
Of cold sublimity, where forms and falls
The Avalanche—the thunderbolt of snow!
All that expands the spirit, yet appals,
Gather round these summits, as to show
How earth may pierce to heaven, yet leave vain man below."

Byron.

The continent of Europe is characterised by two great mountain masses, from one or other of which all the other chains diverge. The first of these is the mountain mass of *St. Gothard*, or the Alps, in Switzerland, and the second is the *Wolchonskywald*, in Russia. To the former of these, the reader need hardly be told, peculiarly belongs all that awful and sublime grandeur which gives to mountain scenery its charms. It is to this dorsal ridge of the continent that Switzerland owes all the sublimity and diversified beauty of scenery which distinguishes it above every other country on the globe. As the first view of them breaks upon the enraptured traveller from the outlying hills of the Jura, his sensations can find no adequate expression in language. Nature towers around and beyond him in her most sublime forms, teaching him, by contrast, his own littleness and that of his most colossal works. True in fact as beautiful in poetry are Rogers' lines:—

"Who first beholds those everlasting clouds—
Those mighty hills, so shadowy, so sublime,
As rather to belong to heaven than earth—
But instantly receives into his soul
A sense, a feeling, that he loses not—
A something that informs him 'tis an hour
Whence he may date henceforward and for ever."

But high above the loftiest of these snowy citadels of nature rises the glorious Mont Blanc, towering aloft above all the mountains of Europe.

Mont Blanc is monarch of the mountains;
They crown'd him long ago
On a throne of rocks, in a robe of clouds,
With a diadem of snow.

To reach the summit of this highest of the Alpine range has always been an object of desire with adventurous travellers. Some, only, of the many attempts which have been made have succeeded. The first of these was made in the year 1762, by Piérre Simon, of Chamouni, who endeavoured to accomplish it by the Glacier du Boissons, and again from the French side, but failed in both. Another equally unsuccessful attempt was made by some villagers in 1773, and again in 1783, by M Bourrit, of Geneva. In 1785, M. de Saussure, M. Bourrit, and the son of the latter, with fifteen guides, left Bionassy in the beginning of September, and ascended the glacier of the same name. On the following day, however, their progress was barred by the snow on the summit of the Aiguille du Gouté, beyond which they did not ascend. In the next year the attempt was again made by six Chamouni guides, but without success. On their descent, however, one of the number, Jacques Balma, strayed from the party, and lost his way amongst the icy ills of the Glacier. After remaining all night in the snow, he discovered, next morning, a route by which the summit could be reached, and then returned to Chamouni with his secret. In the following year he communicated his discovery to Dr. Pachard, a native of Chamouni, and with him started to prove the practicability of his newly-found route.

They succeeded in gaining the summit, after surmounting many difficulties, and returned to the village on the third evening after their departure. During the summer of 1787, M. Saussure successfully renewed his attempt under the guidance of Balma, and accompanied by nineteen other attendants. Since then the ascent has been frequently made by travellers from all parts of Europe. These dangerous enterprises, however, have not been unattended by frequent catastrophes. The terrible avalanche, or, as Byron has it,

> "The glacier's cold and restless mass
> Moves onward day by day,"

and has often swept before it into the fearful gulphs which everywhere abound, the too rash or the inexperienced climber. In August, 1820, Dr. Hamel, a Muscovite, with three gentlemen and twelve guides ascended to the grand plateau. In climbing from it up the side of the mountain, an avalanche swept away the whole party. Only one of the guides was saved, and he almost by a miracle. He was thrown over the precipice, but was stopped in his downward course by a projecting crag, which flung him back into a cavern of snow, where he was afterwards found only just in time to save his life. Similar calamities have occurred not infrequently since.

MONT BLANC.

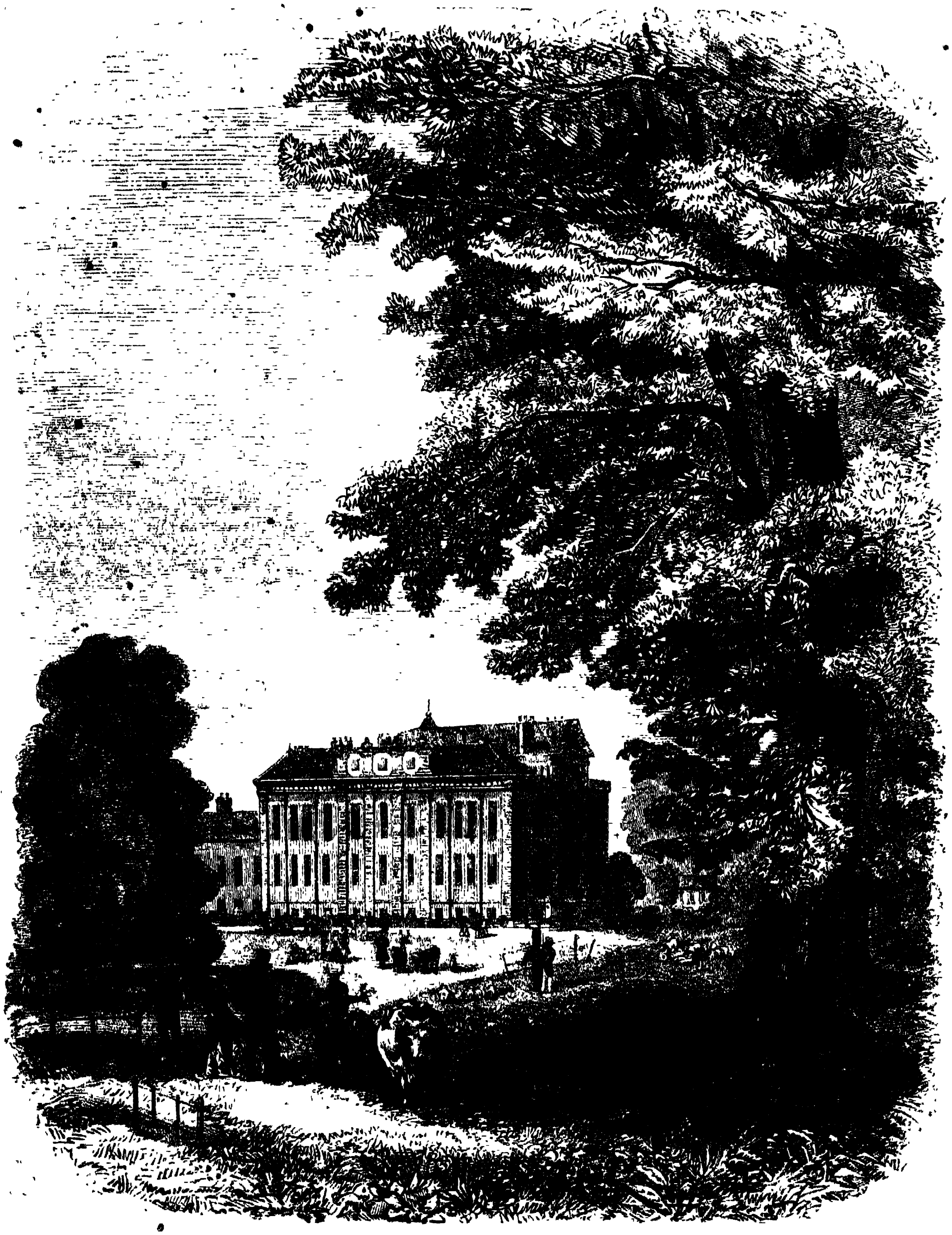
The last and not the least interesting exploration which has been made of this

> "World of wonders, where creation seems
> No more the works of nature, but her dreams,"

was made in the summer of last year, by our own well-known countryman, Mr. Albert Smith, in company with some other English gentlemen and a numerous corps of guides. With the stirring incidents attending this ascent, the readers of *Blackwood* have since been made acquainted by its versatile achiever, in a paper full of graphic descriptions and peculiar touches of great interest. More recently still "the dangers of the way" have been made familiar to the visitors of the Egyptian Hall, by graphic illustrations from the pencil of Mr. Beverly, who took part in the expedition, and by the humourous descriptions of Mr. Smith himself—a combination which gives to his audience very truthful and vivid ideas of the sublime grandeurs of Mont Blanc. In the paper just mentioned the author gives the following account of the view from its summit:—

"The morning was most lovely; there was not even a wreath of mist coming up from the valley. One of our guides had been up nine times, and he said he had never seen such weather. But with this extreme clearness of the atmosphere there was a filmy look about the peaks, merging into a perfect haze of distance in the valleys. All the great points in the neighbourhood of Chamouni—the Buet, the Aiguille Verte, the Col du Bonhomme, and even the Bernese Alps—were standing forth clear enough; but the other second class mountains were mere ridges. It was some time before I could find out the Brevent at all, and many of the Aiguilles were sunk and merged into the landscape. There was a strange feeling in looking down upon the summits of these mountains which I had been accustomed to know only as so many giants of the horizon. The other hills had sunk into perfect insignificance, or rather looked pretty much the same as they do in relief models at the map shops. The entire length of the Lake of Geneva, with Jura beyond, was very clearly defined; and beyond these, again, were the faint blue hills of Burgundy. Turning round to the south-east, I looked down on the Jardin, along the same glacier by which the visitor to the Couvercle lets his eye travel to the summit of Mont Blanc. Right away over the Col du Géant we saw the plains of Lombardy very clearly, and one of the guides insisted upon pointing out Milan, but I could not acknowledge it. I was altogether more interested in finding out the peaks and gorges comparatively near the mountain, than straining my eyes after remote matters of doubt. Of the entire *coup d'œil*, no description can convey the slightest notion. * * * * Where everything is so almost incomprehensible in its magnitude, no sufficient comparison can be instituted."

KENSINGTON PALACE.



Few of royal abodes have so little to recommend them in an architectural point of view as Kensington palace. Standing at the extreme west of London, surrounded by the semi-regal mansions of the nobility, parks, gardens, and far removed from the turmoil of business, or the unseemliness of abject poverty, it seems to protest, by its bare and rigid aspect, against the advance of taste. It was originally the property of the Lord Chancellor, Finch, and was purchased from him by William III., who was attracted by the beauty of the grounds which are attached to it, which are of great extent, being upwards of three miles in circumference, and are now beautifully laid out. After that, queen Mary and queen Anne planted great numbers of trees in the gardens, and enlarged the promenades. During the reign of George I. it was still further improved; and queen Caroline, the wife of George II., had it all redecorated—a painter, architect, and gardener, being set to work under her own superintendence. About the same time Kent painted the grand staircase, and the ceilings of many of the rooms. The apartments contain paintings of great value, and portraits of many of the old masters. It was for many years occupied by the Duchess of Kent, and in it her majesty the Queen was educated and spent the greater part of her childhood. It will, doubtless, for this reason, possess unfading interest in the eyes of all future generations of Englishmen. In November, 1836, a violent storm laid waste the gardens, and rooted up a great number of the trees, and the traces of its ravages may still be seen in the gaps which it made in the long alleys of fine old oaks. Entrance is obtained by six gates, four of which open into Hyde-park.

None of its royal owners displayed so great a predilection for Kensington Palace as George II. and his wife. If houses, the mute spectators of all the incidents of our domestic life, could preserve the echoes of the past, the walls of that old palace would still re-echo with horse laughter, the outbursts of passion, the brusque and positive tones of the German king, who in vain tried to temper his heavy stupidity and obstinacy by an admixture of French gallantry and frivolity. At bottom, however, he had a great deal of goodness of heart, and was by no means wanting in courage, and had the good sense to trust on all occasions to his queen, who was possessed of admirable delicacy and tact. Ably seconded by Sir Robert Walpole, the most astute, most wary, and most fortunate of English ministers, she was almost successful in making the nation think her husband a great man, and, at least, contributed largely to the prosperity which distinguished his reign. Contemporary writers say that she governed the king as pagan priests govern their idols, when prostrated before the altars in public, they receive with all the pomp and pride of ceremonial, and all outward marks of respect, the oracles which they have dictated in private. But so little did the king suspect that his wife possessed such power over him, that in enumerating one day to some of his courtiers the various influences which had predominated over his predecessors, he is reported to have said:—"Charles I. was governed by his wife, Charles II. by his favourites; king James by his priests; William by his partizans, Anne by her women; my father (George I.) by everybody who came near him." And then turning with a triumphant and self-satisfied air to his auditors, he added, "But who can be said to govern now-a-days?"

ON THE METHODS OF SILVERING AND ORNAMENTING GLASS.

The process adopted for silvering plate-glass, to form looking-glasses or mirrors, is as follows:—A leaf of tinfoil, rather larger than the plate to be silvered, is laid upon the flat table of stone or wood employed for this purpose, called the silvering-table, and a quantity of mercury or quicksilver is brushed over it by means of a hare's foot. When the surface of the foil has become uniformly covered, a small quantity of mercury is added, so as to reach a height of ten or twelve lines. The grey oxide of mercury floating on the surface is then removed with a wooden rod, and a brilliant metallic surface is produced. The plate of glass may now be placed upon the metal, but great care must be used, for if the plate were allowed to drop down in a perpendicular direction, dust and air would inevitably be thus allowed to get between it and the metal, and the result would be incomplete. The plate is, therefore, pushed slowly forwards from the side, with the longest edge foremost, taking care that this always dips below the surface of the mercury. By these means the introduction of all extraneous substances is avoided, and the metal alone brought into contact with the glass, whereby a brilliant surface is obtained.

The plate is now floating on a bed of quicksilver, under which lies the sheet of tinfoil, which has become amalgamated or combined with the stratum of mercury in juxta-position with it. The mirror is now covered with woollen cloths, loaded with weights, and the table being inclined at an angle of ten or twelve degrees, the surplus quicksilver runs away and is collected, whilst the amalgamated foil adheres to the face of the glass-plate. The last portions of the mercury are removed, and the drying of the plate effected by placing the latter in an upright position. Three or four weeks are required for completely coating the surface of a large mirror.

The convex surfaces of glass mirrors are silvered in a similar manner, but, instead of a flat table, a mould of plaster of Paris is made use of. Hollow mirrors or globes are silvered by the use of an amalgam consisting of one pound of bismuth, half a pound of lead, half a pound of pure tin, and two pounds of mercury. The first three are melted together, and the mercury added to the mixture when nearly cold. A very gentle heat is sufficient to melt this amalgam. In this state it is poured into a clean glass globe, intended to be silvered, by means of a paper funnel, which reaches to the bottom. At a certain temperature it will adhere to the glass, which, by a proper motion, may thus be silvered completely, and the superfluous amalgam poured out.

This process of coating glass with mercury and tinfoil has its disadvantages. In the first place, the health of the workmen employed suffers much from inhaling the mercurial vapours given off in the process. Again, a very considerable time is required for the silvering of a large mirror, and the process is liable to frequent mishaps. Sometimes the plate of glass is broken by the pressure of the weights with which it is necessary to load it, in order to insure the complete adhesion of the amalgam to its surface. At other times drops of mercury run down, and carry the amalgam with them when the silvered mirrors are placed endways, giving rise to curved streaks technically termed *worms*. The amalgam is also liable to spoil by crystallisation as well as by friction in carriage.

It will thus be seen that the way was open for the reception of any great improvement in the art of silvering looking-glasses. Various remedies as well as preventive means were tried with variable success to remove and overcome the difficulties and objections to which this process was liable.

In 1843 Mr. Drayton took out a patent for "improvements in coating glass with silver for looking-glasses," the object being to coat the surface of the glass not with amalgam of mercury and tinfoil as in the other case, but with *real silver*.

It does not appear that Mr. Drayton was led to this process by any experiments undertaken with the particular view of effecting improvements on the old process; the fact, however, that certain essential oils have the property of precipitating silver when in a certain state of solution in the metallic state having come under his notice, he was induced to try the practical application of this fact to the silvering of mirrors and other articles; thus carrying out, in successful practice, the mode of depositing silver by essential oils, which, in the hands of Count Rumford many years previously, had been used merely as a scientific illustration.

The silvering liquid proposed by Drayton, and which forms the subject of his first patent, is prepared in the following manner: One ounce of nitrate of silver is first dissolved in two ounces of water, to which is added half an ounce of spirit of hartshorn or ammonia; to this solution of nitrate of silver, after it has been filtered, three ounces of spirit of wine containing 20 to 30 drops of oil of cassia dissolved in it are added. This forms the "silvering liquid:" but being of no use if employed alone, it becomes necessary to prepare also another fluid, to which the name of "reducing liquid" is given; this latter fluid having the property of reducing or restoring to its former metallic condition the silver contained in the nitrate of silver dissolved in the silvering liquid.

The reducing liquid consists of a solution of one part of oil of cloves in three parts of spirit of wine.

The "silvering" and "reducing" liquids having been prepared, the surface of the plate of glass to be silvered is first well cleaned and polished, and then surrounded by a rim of putty, when a layer of the silvering liquid one or two lines in depth is poured upon it. A few drops of the reducing liquid are next added, the result of which addition is the formation of a film of brilliant metallic silver, attaching itself firmly to the surface of the glass: the rapidity of this deposit of silver being in proportion to the quantity of reducing solution employed. The coating succeeds best when the reduction proceeds slowly; a very few drops of oil of cloves are required for this purpose, from four to six drops being sufficient to produce a deposit of the silver contained in four ounces and a half of the silvering solution; the film of the metal deposited is so thin, that a square foot of it weighs only from 12 to 18 grains, the value of silver covering a surface of 10 feet by 5 feet, varying from 1-2500 to 1-1700 of a line in thickness, not exceeding from 7s. to 10s. in price.

The silvering liquid which remains after the operation is poured off, and allowed to stand for three or four days in a close vessel, as it still contains silver, and may be again used after it has been filtered, and fresh ingredients added to it, in quantities proportionate to those of the materials consumed.

The *rationale* of this process, or the principle on which it is effected, is as follows:—The oxide of silver (silver in union with oxygen) which was dissolved in nitric acid to form the nitrate of silver used in the silvering liquid, is decomposed or deoxidized by the oil of cloves, that is to say, this oil takes away the oxygen from the oxide of silver, and the silver thus separated from the oxygen falls down in the pure metallic state; the nitric acid which had been employed merely to dissolve the oxide of silver so that it might be obtained in the liquid form for the purpose required, enters into combination with the ammonia, forming nitrate of ammonia which remains in solution. These changes are also effected without any evolution of gas, which might materially interfere with the good result obtained by destroying the continuity of the metallic surface.

The table used in the "silvering" process is of a similar description to that employed in the quicksilver coating process, the glass to be silvered being fixed horizontally upon it by means of suitable mechanism. It is necessary that the plate of glass should be perfectly level, so that the liquid poured on shall be equally distributed over the entire surface of the plate.

The deposit takes place equally well when the surface is flat or of any other form. After it is silvered, it is washed to remove any impurities which may have been deposited with the silver, and then placed in a hot-air closet, where it remains for a few hours until perfectly dry, after which it is varnished to protect it from the action of the air and from mechanical injuries. A plate of glass of any dimensions may be silvered in 48 hours. The "silver" coating adheres much more firmly than that obtained by the old process.

Notwithstanding the evident advantages attendant on the use of the "silvering" process, the old process of "quicksilvering" glass is still employed in the coating of glass for looking-glasses. Although the quantity of silver required is but small, yet the price of the silvering process is about three times greater than that of the quicksilvering method, and this of itself forms a great bar to the adoption of the new process in the commercial manufacture of looking-glasses.

The darker colour of the coating has also been objected to, as well as the effect produced of imparting a dark yellow colour to the object represented.

The greater solidity and durability of the silvering process is, however, much in its favour; and although the first application is more expensive, the additional expense is compensated for by increased durability.

This process of silvering is at the present time being carried out on the commercial scale in Paris, and is more especially employed in the manufacture of reflectors, which are found to be far superior to those formed of polished and plated metal. Reflectors, some of them upwards of 4 feet by 3 feet, have been adopted in some of the lighthouses on the French and English coasts, and have been highly spoken of.

One great advantage of this process is, that surfaces, whether flat or hollow, in relief or in intaglio, can be silvered by its use, thus rendering its employment accessible for various useful and ornamental purposes, for which the "quicksilvering" process is inapplicable.

In 1848 Mr. Drayton obtained a second patent for silvering glass without the use of quicksilver. The new process is as follows:—One ounce of hartshorn or ammonia, two ounces of nitrate of silver, three ounces of water, and three ounces of spirit (spirit of wine being preferred), are carefully mixed together; the mixture is allowed to stand for three or four hours, and then it is filtered. To each ounce of the filtered fluid is added a quarter of an ounce of saccharine matter, dissolved in equal parts of spirit and water,—say about half a pint each. (The saccharine matter preferred for this purpose being grape sugar.) The solution is then allowed to stand for a few hours. The liquid may be used for depositing silver either upon horizontal or vertical surfaces, provided it is kept in contact with the glass, which is to be kept heated to about 160° Farenheit until the required deposit of silver has been obtained. As soon as the silver upon the glass is perfectly dry, it may be varnished with common mastic varnish, to preserve it from being injured by friction.

It will be seen that this process differs from the other in the nature of the solution used for reducing the silver (contained in the solution of nitrate of silver) to the metallic state. In the one case the essential oils of cassia and cloves are used, and in the latter a saccharine solution. In the former case no heat is necessary, but in the latter the reduction requires the agency of heat.

Is is stated that this process possesses several advantages over the other. It is applied on the commercial scale in this country to the silvering of glass globes, vases, &c., by Messrs. Thompson and Co., of Berners-street, who have patented several improvements in the manufacture of glass vessels for useful purposes, such as inkstands, vases, drinking cups, glasses, &c. These are formed double, like one glass within another. The space between is filled with the silver solution through an orifice at the bottom, and when the vessel is sufficiently coated, is emptied, and the opening hermetically sealed. By the adoption of this process, all tarnish from the action of the atmosphere, and wear from continued use, is prevented, and the brilliancy of the glass is preserved as long as the article remains whole; thus uniting the ordinary advantages of glass with the apparent solidity of silver, and forming the nearest resemblance to silver workmanship that can be attained.

When the glass is cut, the brilliancy of the effect is heightened, and the soft floating character of the lights is broken up into countless scintillations. On the other hand, by grinding the glass surface, the reflection is dispersed, and the appearance of frosted silver and the delicate lustre of the pearl are produced. With coloured glass, a wide scale of metallic hues is obtained. These dazzling tints may be compared to the plumage of the humming-birds and the wing-cases of the buprestidæ and other tropical beetles. Indeed, there is not one of the gorgeous metallic tints with which the insect and feathered kingdoms are adorned, that may not be closely copied by this process.

Where the glass is stained yellow, the appearance of gold is very successfully imitated; deeper shades communicate the appearance of bronze; and by appropriate colouring and staining, and by flashing the colourless glass with thin layers of various colours, and cutting the latter away in devices, an endless variety of combined and contrasted effects, of singular beauty and novelty, are obtained. These combinations are composed with due attention to chromatic harmony and proportion, and in adapting the vessels themselves to objects of ornament or use, a proper regard to purity of form is observed.

The processes of luxury and utility to which this novel process has been addressed, embrace every article of table and toilet service to which glass is applicable inkstands, paper-weights, paper-knives, pen-trays, lamp-pedestals, candelabra, candlesticks, salt-cellars, knife-rests, mustard-pots, sugar-basins, butter-coolers, smelling-bottles, flower-vases, &c.; and for interior decoration, door-knobs, finger-plates, mouldings, panels, and chandeliers, being, as Professor Donaldson observes, a new element in the hands of the architect. For moresque decorations, after the manner of the Alhambra, and similar examples in the Eastern style, this discovery is felicitously adapted, overcoming the want of sufficient brilliancy in the materials for construction, from which so many modern attempts in that direction have failed.

Nor is its value bounded by the useful elegancies of Art Manufacture, since it is equally applicable to objects of more practical utility, such as surgeons' speculæ, and railway and other reflectors. Constructed of silvered glass, these articles have a brilliancy beyond that of any other known reflectors, in addition to the advantages of durability, and of requiring no further cleaning than occasional wiping with a dusting cloth. Nor is there any limit to the dimensions of the objects which may be silvered, except the limit of the dimensions to which glass can be blown; nor can these limits be said to apply strictly to this manufacture, for large articles may be composed of separate pieces, and a vase, for example, thirty inches in height, and of proportionate capacity and strength, may be thus constructed, which could not be fashioned by the mere process of blowing.

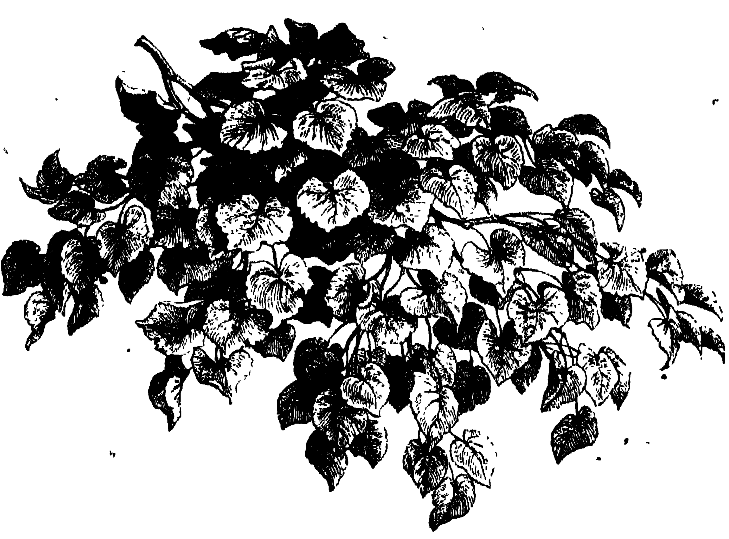
Spheres of glass, of all diameters and capacities, up to forty gallons, are formed and silvered in this way; and so great is their power of reflection, that the entire details of a large apartment are caught upon them with surprising minuteness and clearness of definition, and in that amusing perspective which is peculiar to spherical substances. Another quality of this silvered glass is, that in whatever shape it may be fashioned, it contributes beyond any known material to the effect of artificial illumination, reflecting back unimpaired nearly the whole of the light that falls upon it.

THE LIME TREE (*Tilia*).

The trees of this *genus* belong to the natural order *Tiliaceæ*, and are characterised by the possession of a five-parted deciduous calyx, five petals, numerous free or somewhat polyadelphous stamens, and a globose, villous, one-styled, five-celled ovary. Their leaves are alternate, heart-shaped, acute, serrated, and deciduous, with fragrant, yellowish panicled flowers. The wood is light, smooth, and white, and their sap possesses a large quantity of sugar. They are principally natives of Europe and America. Botanists differ in their nomenclature of the varieties which compose the *genus;* but the following are the names by which the principal species are most generally known.

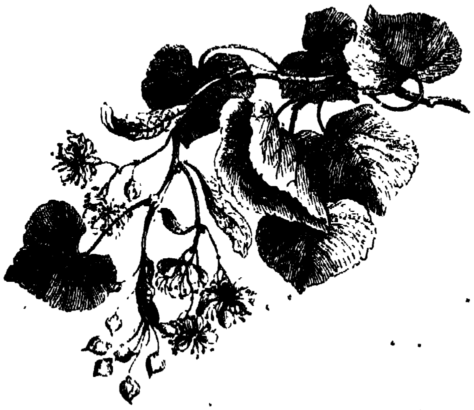
Tilia Europæa, the European, or common lime tree. This variety, which grows very extensively in the middle and northern parts of Europe, is very common in England. Its petals are without scales, and its leaves, which are twice the length of the petioles, are cordate, acuminate, serrated, and smooth, with the exception of a tuft of hair at the origin of the veins beneath: the cymes are many-flowered, and the fruit is coriaceous and downy. Its large size, handsome appearance, and profusion of sweet flowers, cause it to be a very general favourite throughout this country and most parts of the continent, where it is extensively planted in parks and other places of public recreation. Its wood is well adapted for carving, being white, close grained, and smooth. The carvings at Windsor castle, those of Trinity college, Cambridge, and at Chatsworth, are of lime wood, as, indeed, are most of the other fine specimens of this branch of art in England. The fibres of the bark, which is tough, form the material of an extensive manufacture in Russia and Sweden, which is carried on to a considerable extent in this country too. Nor are these the only ways in which it is profitable. Its flowers secrete a large quantity of nectar, and exhale a delicious scent, which render them a great favourite with bees. The honey thus procured is in great repute, and has given celebrity to the honey of Kowno,

Fig. 3.



A LEAF-CLUSTER.

Fig. 4.

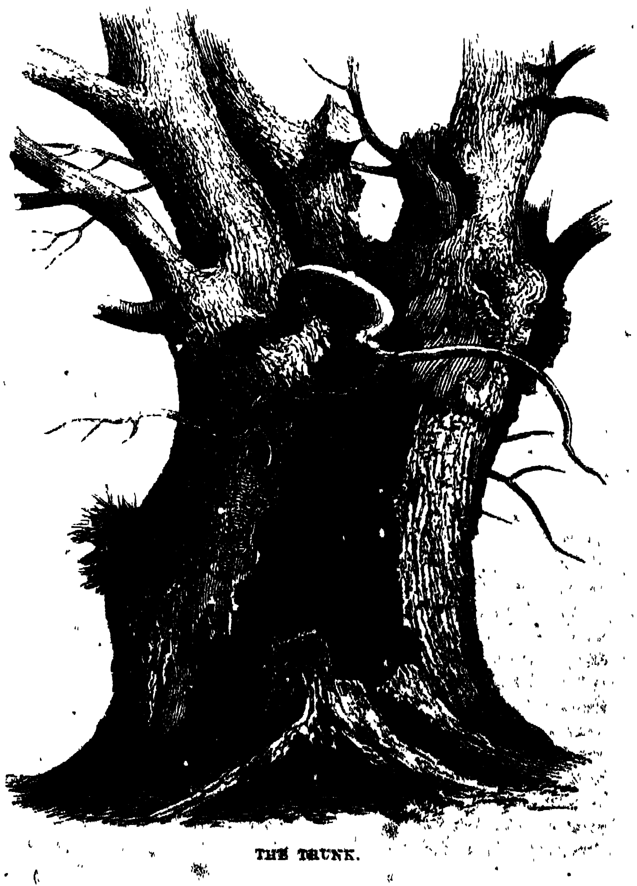


BLOOM.

Fig. 5.

A ROW OF LEAVES.

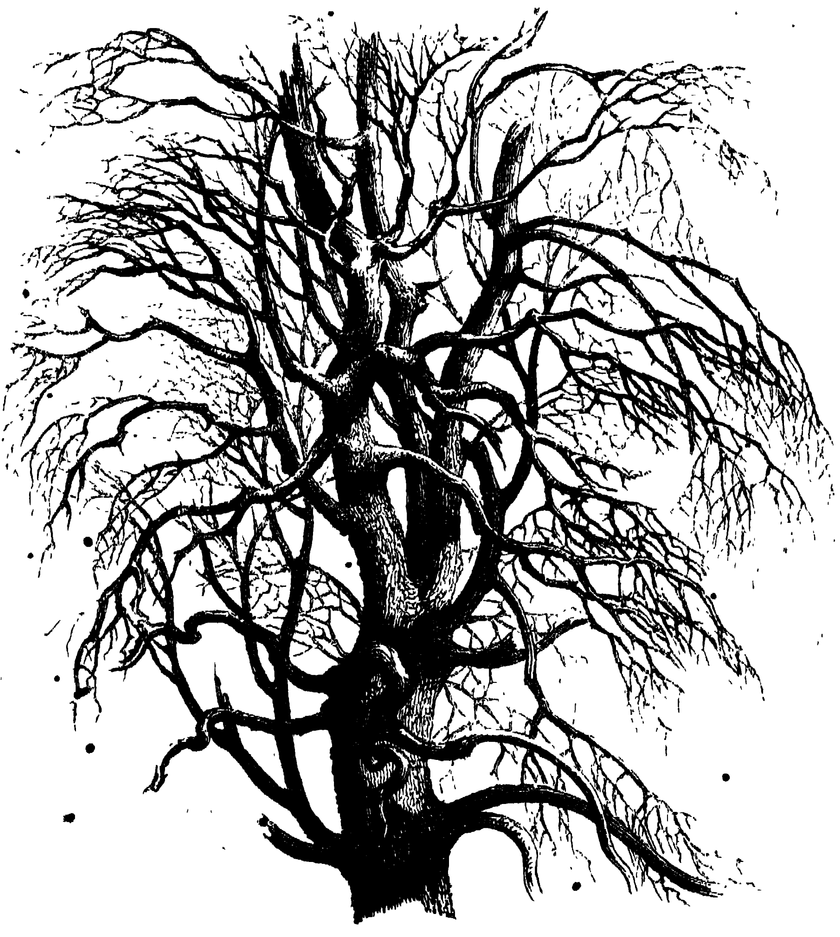
Fig. 1



THE TRUNK.

on the Niemen, in Lithuania, a small town which is surrounded by a forest of lime-trees. Many specimens of this tree exist, which are remarkable for their great age and size. At Neustadt, in Wirtemberg, there is a prodigious lime tree which gives its name to the town, which is called *Neustadt an der Linden* (Neustadt of the lime tree). The age of this enormous tree is said, probably with exaggeration, to be one thousand years. According to a German writer, it required the support of sixty pillars so early as the year 1392, and attained its present size in 1541. It now rests its immense foliage, says the same authority, on above one hundred props, and spreads out so far that a market can be held under its shade. It is of this tree that Evelyn (writing in the middle of the seventeenth century) says that it was "set about with divers columns and monuments of stone (eighty-two in number, and formerly above one hundred more), which several princes and noble persons have adorned, and which as so many pillars serve likewise to support the umbrageous and venerable boughs; and that even the tree had been much ampler, the ruins and distances of the columns declare, which the rude soldiers have greatly impaired." There is another colossal specimen of the same species in the church-yard of the village of Cadiz, near Dresden. The circumference of its trunk is said to be forty feet. A singular circumstance in connexion with it is, that though it is completely hollow through age, its inner surface is covered with a very fresh and healthy bark. Besides these there are many other very old individuals of this species both in England and on the continent. The principal street of Berlin is called *Unter der Linden* (between the lime trees), from the rows of these which grow on each side, and of which, it is said, the Electoress Dorothea planted the first with her own hands, in the year 1680.

Fig 2.



THE BODY OF THE TREE.

T. parvifolia, the small-leaved, or, as it is called in Germany, the winter lime tree. Its petals are without nectaries or scales, and its leaves very similar to those of the last species; like which, too, it grows in forests, both in lowland and mountainous districts. Its trunk grows perfectly upright, and is covered with a jagged, rough bark, which becomes smooth as it ascends to the upper branches. Trees of this species do not generally grow so large as those of the last. The greatest diameter of its trunk is about six feet, and its usual height eighty feet. It attains its full growth in one hundred and fifty years, and its age averages from two hundred to three hundred years. The wood is not so white as that of the European lime, but it is of a reddish yellow colour. Its trunk is not so round as that of the other, but is more knotty. Its greatest peculiarity, however, is the smallness of its leaves, which are only from one inch and a half to two inches in breadth. It is a native of the subalpine districts in the north of Europe. In this country it is common in the woods of Essex and Lincolnshire.

T. rubra, the red lime tree, which many botanists consider merely a variety of the European lime, is a native of Taurida. It has, like all the other species, cordate leaves, unequal at the base, and hairy beneath; the fruit globose and smooth. When young, its branches are of a beautiful coral red colour, and thence it has been called by some botanists *T. corallina*.

T. grandifolia, or the broad-leaved lime. The peculiarity from which this variety takes its name, is its chief distinction. Its leaves, which, like those of the others, are heart-shaped and serrated, vary in breadth from three to six inches. It attains its full growth in about one hundred years, and then varies in height from sixty to one hundred feet, with a diameter of trunk of from two to three feet. The bark of the young tree is of a dark green hue, and is covered with wart-like excrescences; in old trees it turns to a reddish grey colour. In Switzerland and the south of Europe this is the most common of all the varieties of the lime tree. It is scarce in this country. In the church-yard of Seidlitz, in Bohemia, there are some specimens of this tree with leaves contracted into the form of a hood. Tradition has it that they miraculously assumed this shape from the time that the monks of a neighbouring convent were all hanged upon them.

The species which have now been noticed are the most important of the European varieties of this tree. They all differ from those of North America in *not* having nectaries or scales at the base of their petals. A brief enumeration of the American varieties will be sufficient to render this sketch of the lime tree tolerably complete.

T. glabra, or black American lime. The leaves of this tree are deeply cordate, serrated, and somewhat coriaceous and smooth. The petals are truncate and crenate at the apex, and equal in length to the style; the fruit is ovate and somewhat ribbed. It is a native of North America, in Canada and the northern parts of the United States. It is only found in the southern states at a considerable elevation on the Alleghany mountains. It was introduced into England in 1752, but has not been much cultivated.

T. laxiflora, or loose-flowered American lime, is a native of America from Maryland to Georgia. It has cordate, serrated, smooth leaves; loose panicles of flowers; emarginate petals; and globose fruit. Loudon considers it and the other American limes as only varieties of the last species. It has been known in England only since the year 1820, and but little planted since then.

T. pubescens, or pubescent American lime, is a native of the southern parts of the United States, from Virginia to Georgia, where it is principally found on the banks of rivers. Its leaves are somewhat cordate and oblique, truncate at the base, and pubescent beneath; the petals are emarginate, and shorter than the style; the fruit is globose. It is a much less vigorous tree than the last, and has much smaller leaves, and more slender branches.

T. heterophylla, or white American lime. This tree is very abundant in Maryland, Delaware, and the western states of America. Its leaves are ovate and downy beneath, sometimes cordate at the base, and obliquely or equally truncate, its fruit is globose. The white American lime has been known in France for more than a century, but was introduced into England only so late as 1811.

Thus the different varieties of this beautiful tree will have been seen to be almost rather varieties of the same species, differing only in some slight physiological details, than distinct species in themselves. A general description of all would correctly apply, with some inconsiderable exceptions, to each individual variety.

Our illustrations will convey an accurate idea of the various parts of the tree and its foliage.

The engraving (fig. 1) represents a very aged trunk, in which the usual direction of the decay is very correctly shown.

Fig. 2 is a drawing of the body of the tree, in which, especially in close contiguity to the larger boughs, the somewhat knarled and twisted character of the smaller branches is faithfully exhibited.

Fig. 3 is a cluster of leaves, which, perhaps, will better enable the reader to understand their peculiar formation and arrangement than he could do from a verbal description given in the usual botanical phraseology.

Fig. 4. In all except colour this engraving perfectly represents the delicate and very beautiful bloom of the lime tree, from its first bud to the formation of its fruit.

In fig. 5 the exact position of the leaves on the stock is still more minutely depicted.

THE FIRST NOTES OF SPRING.

There is only a complaining chirp, here and there, if the mornings of April continue cold, and the birds are chiefly glimpsed in short flights under the hedges. But, if the weather be mild and open, and there be gleams of sunshine, then, as we track our way through the miry path of the stubble or turnip-field, a few birds are seen running along the furrows, while one of them, perched on a clod, partially rearing his crest, and looking around, at once complacent and confident, utters a series of sounds, as if he were trying the highest and the lowest notes of an instrument. He does all this, indeed, in under tones, yet pleasantly do they fall on the ear, especially when they are regarded as the prelude to the full and swelling harmony of Nature's orchestra.

With such notes are identified many interesting and delightful objects: one plant after another, according to the peculiarities of its structure, sending forth, as the temperature increases, its tender shoots and leaves, in due succession, till every field, and garden, and grove, is teeming with beauty and fragrance; while the lowing of the cattle as they luxuriate in the green meadows; the bleating of the sheep, grazing on the heath-clad hills, with their lambs frolicking gaily about them, and the hum of the bees, as they fly from flower to flower, to gather honey, combine with the varied notes issuing from the bush and brake, in one common hymn of gratitude and praise to the bounteous Giver of all good.

The favourite abode of the sky-lark in Ireland is the wild mountain pasture. In Germany it prefers plains, but frequently fields and meadows. There, as in the northern parts of continental Europe, it is a bird of passage, migrating southwards, in vast flocks, in the month of October, and returning early in the spring. In England these birds, on the approach of the severity of winter, collect from all quarters into extensive flights, while arrivals from the northern regions of the continent contribute to their numbers. The sky-lark prefers the more southern portions of our island, he seeks sheltered situations, and most truthfully it is said —

> "The daisied lea he loves, where tufts of grass
> Luxuriant crown the ridge, there, with his mate,
> He founds their lonely house, of withered herbs
> And coarsest spear-grass, next the inner rock.
> With finer and still finer fibres lays,
> Rounding it curious with his speckled breast."

The nest, too, is commonly placed, if early in spring, in a slight hollow, beside a clod or stone, to screen it from the cold, and always on the sunny side, south or west. Nor is this all the precaution taken by the little feathered artificer. The edges of the nest are raised a little above the surface, having a slope outwards, and being, as it were, thatched. The position, too, in which the bird sits is a further security. the head is always turned to the weather; the feathers of the breast and throat completely prevent the rain from entering the nest at that side, while the wings and tail act as pent-houses in the other parts; and, when the weather is violent, and the rain at a small angle with the horizon, the front of the bird, on which the plumage is thickest, receives the whole of it.

In vain do we now look for the lark chirping on the clod;—it is gone, nor can it be traced as we gaze around the arable champaign. But, hark to that note! how it comes trilling down upon the ear! what a stream of music—note falling over note in delicious cadence! For the lark is now warbling on the wing, raising its song as it soars, until it seems lost in the immense height above us; the note continuing, even when the bird itself is invisible;—and if we wait, we shall see it descending with a swell as it comes from the clouds, yet sinking by degrees, as it approaches its nest—the spot where all its affections are centered—the spot that has prompted all this joy.

The opening of the year, as well as of the day comes fresh to the imagination as the exclamation rises to the lip,

> "Hark! the lark at heaven's gate sings;"

hence we listen to its song with peculiar delight, and say with Wordsworth.—

> "To the last point of vision, and beyond,
> Mount, daring warbler! that love-prompted strain,
> ('Twixt thee and thine a never-failing bond,)
> Thrills not the less the bosom of the plain;

Yet might'st thou seem, proud privilege! to sing,
All independent of the leafy Spring.

Leave to the nightingale the shady wood;—
A privacy of glorious light is thine,
Hence thou dost pour upon the world a flood
Of harmony, with rapture more divine:
Type of the wise, who soar—but never roam,
True to the kindred points of heaven and home."

The time when the lark is first in song, its general appearance, and especially its habits, render it a favourite; and even those who go in quest of nests, often regard the humble dwelling of this bird with a feeling which partakes of veneration. The safety of the lark from birds of prey, consists in the closeness with which it can lie, and the similarity of its colour to that of the clods. It is said that, by ruffling its plumage, it assumes the surface and tint of a heap of wet mud. When on the wing, it generally soars above the birds that beat the bushes, and, if they attempt to approach it, the lark does not descend in the curve it usually forms when alighting, but drops down perpendicularly, just like a stone. It has less fear of man than many of the little birds: for it sings joyously over the fields while their culture is advancing; and it will frequently alight to pick up the insects and worms which are then disclosed by the plough and the harrow. Its song, too, continues for eight months, and thus the history of this little minstrel is identified with the natural phenomena of the greater part of the year.

The lark is often caged, and accustomed as it is to soar towards the heavens when singing,—the very type of liberty—we are conscious of regret whenever we see it forbidden to wing, at pleasure, its upward and lofty flight. Yet, it should not be forgotten that this little bird often enlivens with its cheerful song the toil of the artisan, shut up in the narrow street, or still narrower court, of some town, while it recalls the rural scenes of earlier life, or aids the imagination in picturing the verdant and sun-lit meadow, bordered, it may be, by fertile hills or mountains, with which its notes are indissolubly associated. And then, regret may be soothed with the thought that the sky-lark is generally treated with affectionate care; often, indeed, is the first walk of the artisan taken in the very early morning, that he may bring home a fresh sod of clover to be placed in the cage of his tuneful favourite.

"Nowhere," says Mr. Thompson, "is the sky-lark more sought for, as a cage-bird, than in Ireland, and the song given forth right merrily from the little patch of green sward, seems to imply that the bird bears its confinement well." The same naturalist also tells how one of them was valued by "a rather poor chandler in Belfast." A great bird-fancier one day entering the shop, said that he had come to purchase his lark. "Indeed!" was the reply; "I do not think that you are likely to get home that bird, which delights all my neighbours as well as myself." But now the powerful motive was presented. "Well, I think I am; here are five guineas for it." Yet this sum was instantly refused, as were ten guineas immediately after. A further, and, it was presumed, a conclusive appeal was now made: "It is the fair-day, and the market full of cattle; go and purchase the best cow there, and I will pay for her." But the offer was made in vain, and the lark continued its song in the same humble shop.

BERZELIUS, THE SWEDISH CHEMIST.

The science of chemistry did not take its rise until towards the close of the last century, but since that time the progress which it has made has never been equalled in any other department of human knowledge. Hardly a year passes over our heads without leaving behind some new and astounding discovery, and yet the future is vague and uncertain, because no man can tell how much may yet be achieved. Bodies which were for a long time regarded as compound are now known to be elementary; new ones have been discovered, and combinations have been effected which the men of 1800 would doubtless have deemed impossible, until at length there is hope entertained that before very long the means may be discovered of making diamonds and gold. Chemists, then, have no great masters of antiquity to imitate or revere. Their great men are all of the present age—the Liebigs, the Davys, the Blacks, the Priestleys, and Lavoisiers; and not least amongst these was Berzelius. Many have made more brilliant discoveries, or have enunciated more striking theories, but none has played a more important part in the progress of science during the thirty years which ended with his death in 1848. John Jacob Berzelius was born on the 29th of August, 1779, at Vaefersunda, a village in Ostgothia, the same province which gave birth to Linnæus. His father was the master of the parochial school, and taught him the first elements of knowledge. He was set apart by his parents for the study of medicine, and they sent him when he was only seventeen to the university of Upsal. Upon entering, he gave most of his time and attention to chemistry, under the direction of Afzelius, who was professor of the science at that time, and was assisted by Ekeberg; but as all the lectures were delivered with but few, if any, illustrations, it may be readily conceived that little progress could be made in this way. One day in the week, however, the pupils were admitted to the laboratory, but Berzelius managed to get in every day, and as he had perceived at an early period that his instructors could neither direct his studies nor satisfactorily explain the phenomena which were produced before their eyes, he set to work for himself, accompanying his experiments by diligent and attentive reading. Chemistry, as taught at that period at Upsal, was nothing but a mass of vague ideas, obscure and often contradictory, so that few cared to occupy themselves with it. But the ardour of young Berzelius increased as he proceeded, and the perseverance with which he sought to obtain the solution of difficult questions excited the admiration of his fellow students, and the envy and secret dislike of the professors. Having finished his course he came to Stockholm, and was there appointed assistant to Professor Sparman, who then occupied the chair of medicine at the university; and at the death of the latter in 1896 he was appointed to the vacancy. In the school of medicine at Stockholm there were then but three professors, who divided the course between them. Berzelius taught pharmaceutical chemistry, but his course was for some time by no means successful, because like his old master, Afzelius, he read his lectures, but did not exhibit any experiments. In 1812, however, he paid a visit to London, and while here had an interview with Dr. Marcet, who gave him a list of the experiments by which he had illustrated his course. Some time after the two chemists again met at Genoa, and Berzelius then showed the doctor an immense number of additions which he had made to his list, and which the latter copied. These were shortly after adopted in all the Swedish universities, and in most of those on the continent.

His lectures were now full of interest and instruction, and his lecture room was always crowded to excess. All the time he could spare from his official duties was devoted to private study.

In 1806 he commenced a periodical work entitled "Memoirs upon Physics, Chemistry, and Mineralogy," in which he inserted full accounts of the results of all his researches. This procured his admission, in 1808, to the Academy of Science at Stockholm, of which he was elected president in 1810, and from 1818, until his death in 1848, he was secretary likewise. In 1804, while making with another chemist some researches upon a mineral found in a copper mine, he discovered the oxide of a new metal, to which he gave the name of cerium, from the planet Ceres which had just then been perceived for the first time. The invention of the galvanic battery by Volta, led him to make observations upon the action of this new agent upon various bodies; and in being the first to discover that it had the property of decomposing salts, Berzelius had the honour of preparing the way for Davy's great achievement—the decomposition of alkalies, which until then were considered simple bodies.

In 1823 he started a periodical publication which had great influence upon the progress of chemistry—the "Annual Report upon the progress of Chemistry, Physics, and Mineralogy." It appeared regularly during twenty-five years. In this work he discussed and criticised all the chemical works which appeared during the year; and that he might be better enabled to judge of their accuracy, he made all the experiments to which they referred himself. However praiseworthy his object might have been, this exposed him to a great deal of envy and obloquy, as the severity of his strictures often wounded the self-pride of individuals who had attained to considerable eminence, and did not acknowledge Berzelius's superiority. Still there is no work the dicta of which are received with so much deference.

In 1825 he published his essay on the "Employment of the Blow-pipe in Chemical Analyses and Mineralogical Researches." This instrument had been already made use of in chemical experiments by Swab, Cronstadt, Bergmann, and Gohn, so that it was peculiarly Swedish in its origin, and almost in its use.

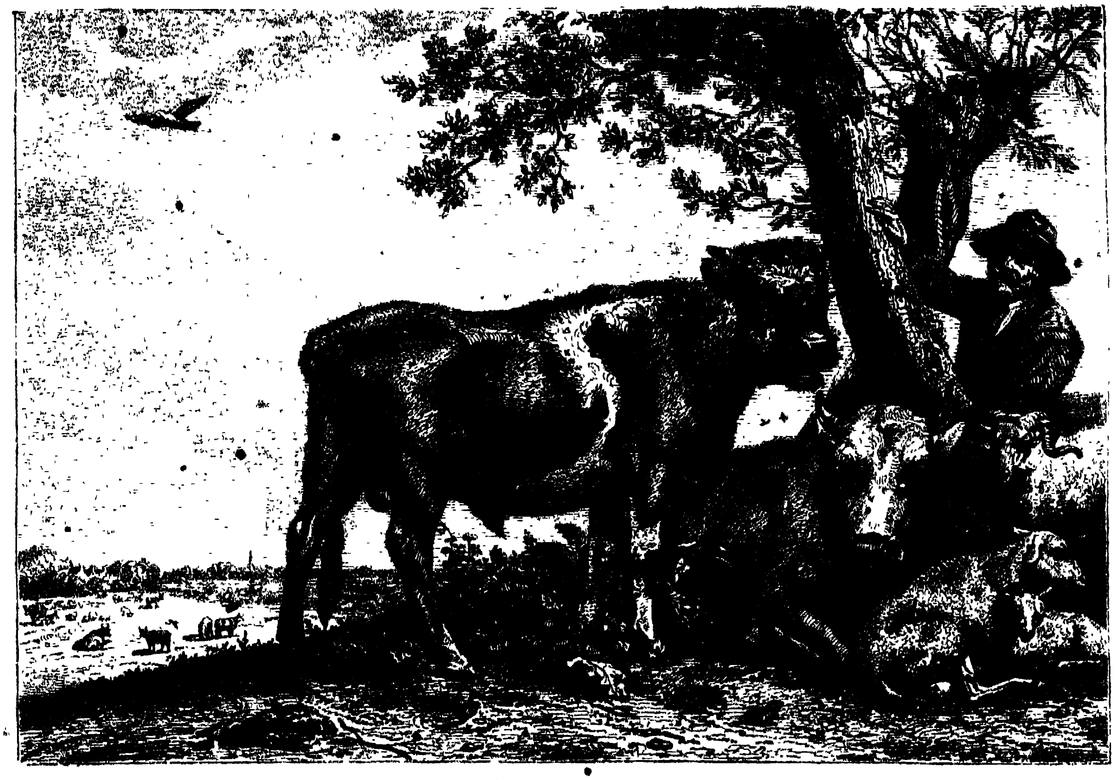
BERZELIUS.

It was left for Berzelius, however, to bring it to the highest perfection, and thus to work a complete revolution in mineralogy and metallurgy. He showed that in directing the flame of a spirit lamp or wax taper upon the fragments of most minerals when placed upon live coal, in their fusion, the bodies may be discovered which enter into their composition. If this were not sufficient, he added some simple reagents, which in combining with the body upon which the experiments were being made, revealed its nature and component parts.

He also published a "Treatise on Chemistry," which went through five editions. But these new editions were not merely reprints; each one was carefully re-written by the author, and in it were incorporated all more recent discoveries, whether made by himself or others. The fifth appeared in 1842, and Berzelius seems to have been almost assured that it would be the last. In the preface, he says: "I cannot conceal from myself that, should the Supreme Being grant me strength to complete the present edition, it must, necessarily, be the last." Severe and oft-recurring attacks of gout warned him of the approach of the great enemy six years before he came; and these, combined with repeated indications of liability to apoplexy, rendered the closing years of his life painful and laborious, although they did not by any means diminish his activity. He never laboured under any delusion regarding his health, but, like a truly great man, he wrought earnestly in his high vocation while it was day, knowing that the night was at hand when no man can work. Besides those we have mentioned, he was the author of many smaller works, in which he has given his various discoveries in full detail—those of six simple bodies—viz., thorinium, cerium, selenium, zirconium, and columbium. He placed beyond doubt the metallic nature of ammonium, and showed the various properties of silica, which acts as an acid upon a great number of bases, from which result salts—such as the silicate of potassium, the silicate of iron, &c. He improved the nomenclature of Lavoisier, and placed upon a firm basis the simple laws which regulate all chemical combinations, and applied to their operation the electro-chemical theory, with all its consequences. He raised the study of chemistry in the eyes of the world by his analyses of blood, urine, milk, and tears, showing the presence of lactic acid in the last—a discovery of the utmost importance in a physiological point of view. He died, as we have already said, in 1848.

PAUL POTTER.

The Dutch school of painting, although it has attained to great celebrity, owes none of it to the dignity, imagination, or *beau ideal* of its works. They are all addressed to the eye, and require no effort of the mind to judge of their excellence or truthfulness. Their subjects are mostly drawn from the most unromantic, and often the coarsest scenes of low life. Phlegmatic Dutchmen quarrelling over their beer, a fishwoman skinning an eel, a young woman peeling a turnip, a cow chewing her cud, peasants with hobnailed shoes dancing in a gin-shop, have all been depicted on canvas with lavish expenditure of labour, ingenuity, and colouring. To have been born in the thick atmosphere of Bœotia was in ancient times a synonyme for heavy stupidity; and though many instances have occurred to prove that the connexion between thick air and thick skulls cannot always be shown to exist, there can be no doubt that the Dutch, the inhabitants of the lowest-lying, foggiest, and dampest country in the world, are also the least poetical and least imaginative of all the nations of western Europe. Artists generally mould their style to suit the tastes of their public, and every work of the Dutch school bears testimony to the matter-of-fact character of the people. Every one of the subjects we have been mentioning excites admiration in Holland. "To the Dutch," to use the expressive words of Allan Cunningham, "Ostade is a Raphael, and Rembrandt a Titian; and boors quarrelling at a fair, a scene in Paradise peopled with angels."



LANDSCAPE, WITH CATTLE. FROM A PAINTING BY POTTER. DRAWN BY FREEMAN.

Amongst the foremost of this school, not merely in execution, but in point of taste, was Paul Potter. He was the son of a painter who never got beyond mediocrity; and as soon as he was able to hold the pencil or brush, he gave undoubted evidences of his extraordinary ability in drawing animals and pastoral scenes. His short life was wholly devoted to the study and delineations of the landscapes which surrounded his birthplace. Amsterdam, where he was born in 1625, is, however, a town rather maritime than pastoral, and he therefore left it and fixed his residence at the Hague, where he married the daughter of an architect. The Hague is admirably situated in the midst of luxuriant meadows, close to a large forest which extends to the sea. It is perhaps the only town of northern Europe situated so near the ocean, which can boast the possession of such fine trees. To describe the freshness, verdure, and calm repose of the surrounding scenery, was a task peculiarly adapted to Potter's powers. He seems to have entered fully into its spirit; but it is as a painter of animals that the firmness, vigour, and truth of his sketches are fully displayed. Cows, oxen, sheep, and goats, he painted in the highest perfection. His colouring is soft, agreeable, and true to nature; his touch is free and delicate, and his outline very correct. His skies, trees, and distances, show a remarkable freedom of hand, with a masterly ease and negligence. He was certainly one of the best painters of Holland, not only for the freedom of his pencil, but for his exact imitation of nature, which he incessantly studied. His chief and in fact only amusement was walking in the fields, sketching every object and scene on the spot; and he afterwards composed his subjects from his drawings, and frequently etched them. All his paintings bear a very high price, and are very scarce in consequence of his dying so young, being only twenty-eight years of age. One of his landscapes, which he painted for the Countess of Solmes, was sold to Jacob Van Hoeck for two thousand florins. The correctness of the animals in their various postures and physiological structure, the verdure of the trees and correctness of the leafing, are sufficient guarantees of the genuineness of his works. The painting from which our engraving is taken is considered his *chef d'œuvre*. The man and the animals are of life size, and the background is exquisitely finished. It formerly belonged to the collection of the Prince of Orange, was carried off and placed in the Louvre by Napoleon, and was restored in 1815, and is now in the Museum at Amsterdam. It is stated to be worth £16,000. Potter has only left one hundred paintings in all, and but a few of them are in England. There are three in the Dulwich Gallery; but the best are in possession of Her Majesty and the Marquis of Westminster.

PRINCIPLES OF ART APPLIED TO DOMESTIC USE.

You are going to decorate your drawing-room or dining-room both with furniture and colouring. Before you speak to your upholsterer or house-painter, have a perfect understanding and recognition of what is the aspect of the room. Let no circumstances make you regardless of this fundamental consideration. No cost will remedy the forgetfulness. Spend what you will, you will always repent having a cold colour in a room lighted from the north, or a very hot colour in a room lighted from the south. If the aspect be north, north-east, north-west, or due east, the general tone of colouring should be positively warm. Blues, greens, and all shaded colours which involve any predominant use of blues must be avoided. There is a drawing-room in the Reform Club, looking north, which may convince any one of the mistake of forgetting aspect. The walls and curtains are blue; with all its elegance—and its ceiling and cornice are beautiful—the effect of this room by daylight is always chilly. It would be just the reverse if it looked upon Carlton Gardens. There is also a room in Windsor Castle, looking on the north terrace, called queen Adelaide's room, which is decorated with blue and silver, a most frigid-looking room even in the midst of summer. In such aspects the choice should tend towards reds, and all their various combinations with yellow. As the aspect approaches east and west, so colours should verge towards yellow rather than red tints. In an eastern aspect, tints of light yellows, lemon-colours, &c., are always effective and cheerful. If the aspect of the room be south, south-west, or west, and open to the sun, then we may venture on the use of cooler colours, even on positive blue, should our taste lead us in that direction.

The supply of light, the size of the room, and its purpose, appear to be the chief circumstances which ought to regulate the strength or depths of the colours to be used. Where the light is strong, unobscured, and plentiful, the tone of the colouring may be full; on the other hand, where the supply of light is small, the tone of the colouring should be light. In the houses of the ancients, the strongest and darkest colours, even blacks, were used on large surfaces, when the apartment received a direct and full light from above. Under a strong and abundant light, full-toned colours preserve their brightness and distinctive character, but when the light is feeble, and the supply of it limited, they become dull and gloomy. Full-toned colours lessen the apparent size of the room; light colouring enlarges it. A little attention to the proportion between the space to be coloured and the depth of the colouring, becomes therefore of great importance. If you wish to make your room appear as large as possible, then exclude dark colouring, not only on the large surfaces, but even in the patterns of the paper-hangings, and in the mouldings and ornamental parts. The nature of the use to which the room is applied, should also influence the decision as to the tone of colouring. If the room is used mostly by artificial light, which, being less pure than day light, materially modifies the appearance of most colours—much or little, according to their strength—then keep the colouring light. If, on the other hand, it is a room for occupation during daylight, then the tone of colouring must be deep. Red and green, with black, appear dark and grave; with white, they appear gay. We see these effects strikingly illustrated in book wrappers. Black letter-press is applied indiscriminately to red, blue, lilac, green and yellow covers. A publisher of taste would do well to consider how much the purchase of a book is affected by the first impression it makes.

BEN JONSON.

"Here is a poet! whose unmuddled strains
Show that he held all Helicon in's brains.
What here is writ, is sterling; every line
Was well allowed of by the Muses nine.
When for the stage a drama he did lay,
Tragic or comic, he still bore away
The sock or buskin; clearer notes than his
No swan e'er sung upon our Thamesis,
For lyric sweetness, in an ode or sonnet,
To Ben the best of wits might vail their bonnet.
His genius justly, in an entheat rage,
Oft lashed the dull-sworn factors for the stage:
For Alchymy, though't make a glorious gloss,
Compared with gold, is bullion and base dross."

HODGSON.

Benjamin, or, as he himself usually shortened his name, Ben Jonson, "made his first entry on the stage of this vain world," says one of his early biographers, "about a month after his father's death, within the city of Westminster." This happened in the early part of 1574, while the "good queen Bess" was upon the throne. His grandfather, who was a man of some family and fortune, originally settled in Annandale, in Scotland, from which place he removed to Carlisle, and was subsequently taken into the service of Henry VIII. His father, who was probably about the court, suffered a long imprisonment under queen Mary, for his religious opinions, and finally lost his estate. Subsequently, in Elizabeth's reign, he entered into holy orders, and became "a grave minister of the gospel." His preferment, however, must have been scanty, as his widow was obliged to marry a master bricklayer in somewhat less than two years after his death. Such were the early facts of Ben's family history.

When the future poet became of sufficient age, he was sent to a private school near St. Martin's-in-the-Fields; and there he acquired a respectable acquaintance with the rudiments of general knowledge. From this school he would probably have been taken to follow his step-father's business, had not a friend, whose name is not mentioned, sent him, at his own expense, to Westminster school, where the great Camden was then second master. This celebrated man was not slow in discovering, nor negligent in cultivating, the extraordinary talents of his pupil. How long he remained under his care is not known; but the poet, who had a warm and affectionate heart, ever after cherished the deepest gratitude for the kindness of his old master, whom he thus addresses in one of his epigrams:—

"Camden, most reverend head, to whom I owe
All that I am in arts, and all I know."

And, again, in the dedication of his *Every Man in his Humour*, he tells his "most learned and honoured friend" that he "is not one of those who can suffer the benefits conferred upon his youth to perish with his age," and adds: "Now I pray you to accept this—such wherein neither the confession of my manners shall make you blush, nor of my studies repent you to have been the instructor; and, for the profession of my thankfulness, I am sure it will, with good men, find either praise or excuse."

About his sixteenth year young Jonson left Westminster for Cambridge, where the kindness of the friend who had hitherto borne his expenses procured him an exhibition, and he was accordingly, as Fuller says, "statutably admitted into St. John's College." But his stay at the University was short; the exhibition was found inadequate to his support, and, much against his will, young Ben returned to his home. Here he laboured for a time at his step-father's occupation, with which he was soon disgusted, and, seeing no other means of escape from its "ignoble drudgery," he volunteered into the army then employed in Flanders. His stay in the low countries, however, only extended over one campaign, and he returned to England, bringing with him nothing more substantial than the reputation of a brave man, a smattering of Dutch, and an empty purse. His situation, at this time, was hopeless enough. In the occupation of a bricklayer he had attained no skill, and, even if he had, his aversion to the business was unconquerable. To turn his education to some account, was, therefore, his only resource, and accordingly, about the age of nineteen, he turned to the stage. Like so many others of his period, he commenced as an actor before he became a writer. His *début* was made at the "Green Curtain in Shoreditch," where he continued for a time with but indifferent success. But an event now occurred which threatened more serious consequences than an interruption of his professional labours. Quarrelling with a fellow actor, he was "appealed to a duel;" the challenge was accepted, and he killed his antagonist. As duelling was at this time reckoned no better than murder, Jonson, severely wounded, was thrown into prison, and, as he says himself, "brought near the gallows." During his confinement he was visited by a popish priest, "who," says his best biographer, "took advantage of the unsettled state of his religious opinions to subvert his mind, and induce him to renounce the faith in which he had been bred, for the errors of the Romish church."

We may here remark, however, that he returned to the bosom of the English church about the year 1606.

On his deliverance from prison, he returned to his theatrical pursuits, and married. This last prudent step was taken about 1594. He now began to write as well as act, and two years after the date just mentioned, *Every Man in his Humour*, the first of his known comedies, appeared. This production, which was highly successful, bears throughout strong traces of the ennobling idea which Jonson had already formed of poetry in general, and of the true and dignified office of the Dramatic Muse.

> "Indeed if you will look on Poesie,
> As she appears in many, poor and lame,
> Patch'd up in remnants, and worn-out rags,
> Half-starved for want of her peculiar food,
> Sacred invention; then I must confirm
> Both your conceit and censure of her merit.
> But view her in her glorious ornaments,
> Attired in the majesty of art,
> Set high in spirit with the precious taste
> Of sweet philosophy, and, which is most,
> Crown'd with the rich traditions of a soul
> That hates to have her dignity profaned
> With any relish of an earthly thought;
> Oh, then, how proud a presence does she bear!
> Then is she like herself; fit to be seen
> Of none but grave and consecrated eyes!"

According to Steevens, the whole of the prologue to this comedy "is a malicious sneer at Shakspeare," with whom Jonson had had some disagreement about theatrical matters before he composed it.

In 1598, Jonson endeavoured to render his play still more popular by changing the scene and proper names from Italian to English; and thus altered it was brought out at the Blackfriar's theatre, Shakspere himself being one of the principal performers. His next piece was the comic satire of *Every Man out of his Humour*, which appeared during the following year. This piece was likewise successful: its leading characters are drawn with vigour; the exposure of absurd humours is excellent; and there is some real, though much laboured, wit in the dialogue. Yet, as Mr. Gifford, his best editor, allows, "the plot is progressive, but not well combined; the action awkwardly helped forward by the chorus; and the catastrophe, though sufficiently ingenious, not altogether legitimately produced by preceding circumstances." The epilogue contains some gross flattery of Elizabeth, who was present during one of its performances. In 1600 he produced his *Cynthia's Revels*, which was a satire upon the grave and formal manners of the court. *Cynthia* was the queen, and under this name he belauds "the obdurate virgin" in the following style:—

> "O front! O face! O all celestial, sure,
> And more than mortal! Arete, behold
> Another Cynthia, and another queen,
> Whose glory, like a lasting plenilune,*
> Seems ignorant of what it is to wane.
> Not under heaven, an object could be found
> More fit to please."

The *Poetaster* followed in 1601, when it was brought out at the Blackfriars by the children of the queen's chapel. This piece was occasioned by a quarrel with Decker, who is satirised under the name of Crispinus. Decker retaliated in a play called *Satiromastix*, in which Jonson appears under the title of Young Horace. The *Poetaster* brought its author into considerable trouble; and after a few representations he added to it an "Apologetical dialogue," in which he gave notice that his next efforts would be given to tragedy:—

> "And since the comic muse
> Hath proved so ominous to me, I will try
> If tragedy have a more kind aspect:
> Her favours in my next I will pursue."

He did so, and *Sejanus* appeared. This tragedy was not successful at first, but being recast, it was brought out (in 1603) at the Globe, and Shakspere performed in it. This play possesses merit of the highest order. In the strong masculine delineation of its characters, even Shakspere himself has nothing superior to it; whilst the manners of the age in which it lies are described with a graphic power which proves its author's profound acquaintance with antiquity.

On the death of Elizabeth, and accession of James I., fairer prospects began to open on Jonson. The queen had been penurious; and when she did give, was more fond of rewarding flattery than merit; but James was more generous, and our poet had the good fortune to be quickly received into his favour. Its tenure, however, threatened to be short. Marston and Chapman had written a comedy called *Eastercood Hoe!* in the composition of which Jonson was suspected of having taken part. One passage of this piece contained some taunting reflections upon the Scotch, and the testy monarch accordingly ordered the arrest of the three poets. But, after narrowly escaping the loss of ears and noses, the offending authors were released, but not without much interest. Ben was again taken into favour by the king. His noble play, *Volpone, or the Fox*, was the next production of his muse. This, which far surpassed any of his previous efforts, was brought out at the Globe in 1605. It was followed, in 1609, by his *Epicœne, or the Silent Woman*, which Dryden regarded as a perfect comedy. The next year witnessed the production of the noblest effort of Jonson's genius—*The Alchymist*—from a scene in which our illustration is taken. "This drama," says one of the latest biographers of its author, "has never been surpassed by the most glorious efforts of genius." It is a marvellous satire upon the vices and follies of the age.

Alchymy and astrology were then in high repute, and had their dupes amongst the most learned men of Europe. With the pretended mysteries and powers of these wide-spread delusions, our poet was perfectly acquainted, and in this greatest of his plays he brings them into deserved ridicule by describing some of the scenes which were then of daily occurrence in the sanctums of these *soi-disant* philosophers. Our engraving represents a tobacconist, named Abel Drugger, Subtle, an alchymist, and Face, his butler and tool, who calls himself captain. Drugger is opening a new shop, and desires to know where the door and windows should be, and how his shelves and boxes ought to be arranged. The scene is one of the best in the play:—

> "*Subtle.* What is your name, say you, Abel Drugger?
> *Drug.* Yes, sir.
> *Sub.* A seller of tobacco?
> *Drug.* Yes, sir.
> *Sub.* Umph! Free of the grocers?
> *Drug.* Ay, an't please you.
> *Sub.* Well—your business, Abel?
> *Drug.* This, an't please your worship:
> I am a young beginner, and am building
> Of a new shop, an't like your worship, just
> At corner of a street. Here is the plot on't—
> And I would know by art, sir, of your worship,
> Which way I should make my door, by necromancy,
> And where my shelves; and which should be for boxes,
> And which for pots. I would be glad to thrive, Sir:
> And I was wished to your worship by a gentleman,
> One Captain Face, that says you know men's planets.
> *Sub.* I do,
> If I do see them ———"

Face enters at this juncture, and craves the best services of the philosopher for his friend Abel. The alchymist accordingly promises boundless prosperity, conditionally, of course, upon Abel's following the directions which he is about to give him. Pointing to the plan of his house, which the tobacconist had brought with him, Subtle proceeds:—

> "Make me your door, then, south; your broad side, west;
> And on the east side of your shop, aloft,
> Write Mathlai, Tarmiel, and Baraborat;
> Upon the north part, Rael, Velel, Thiel.

---

* Full moon.

SCENE FROM BEN JONSON'S "ALCHYMIST."

They are the names of those mercurial spirits,
That do fright flies from boxes.
Face. That's a secret, Nab!
Sub. And, on your stall, a puppet, with a vice
And a court-fucus to call city dames:
You shall deal much with minerals.
Drug. Sir, I have
At home, already ——— —
Sub. Ay, I know you have arsenic,
Vitriol, sal-tartar, argoile, alkali,
Cinoper: I know all. This fellow, captain,
Will come, in time, to be a great distiller,
And give a say—I will not say directly,
But very fair—at the philosopher's stone.
Face. Why, how now, Abel! Is this true?
Drug. Good captain,
What must I give? [*Aside to* Face.
Face. Nay, I'll not counsel thee.
Thou hear'st what wealth (he says, spend what thou can'st,)
Thou'rt like to come to.
Drug. I would gi' him a crown.
Face. A crown! and toward such a fortune? heart,
Thou shalt rather gi' him thy shop. No gold about thee?
Drug. Yes, I have a portague I've kept this half year.
Face. Out on thee, Nab! 'Slight, there was such an offer—
Shalt keept't no longer, I'll giv't him for thee. Doctor,
Nab prays your worship to drink this, and swears
He will appear more grateful, as your skill
Does raise him in the world.
Drug I would entreat
Another favour of his worship.
Face. What is't, Nab?
Drug. But to look over, sir, my almanack,
And cross out my ill days, that I may neither
Bargain, nor trust upon them.
Face. That he shall, Nab;
Leave it, it shall be done 'gainst afternoon.
Sub. And a direction for his shelves.
Face. Now, Nab,
Art thou well pleased, Nab?
Drug. 'Thank, sir, both your worships." [*Exit.*

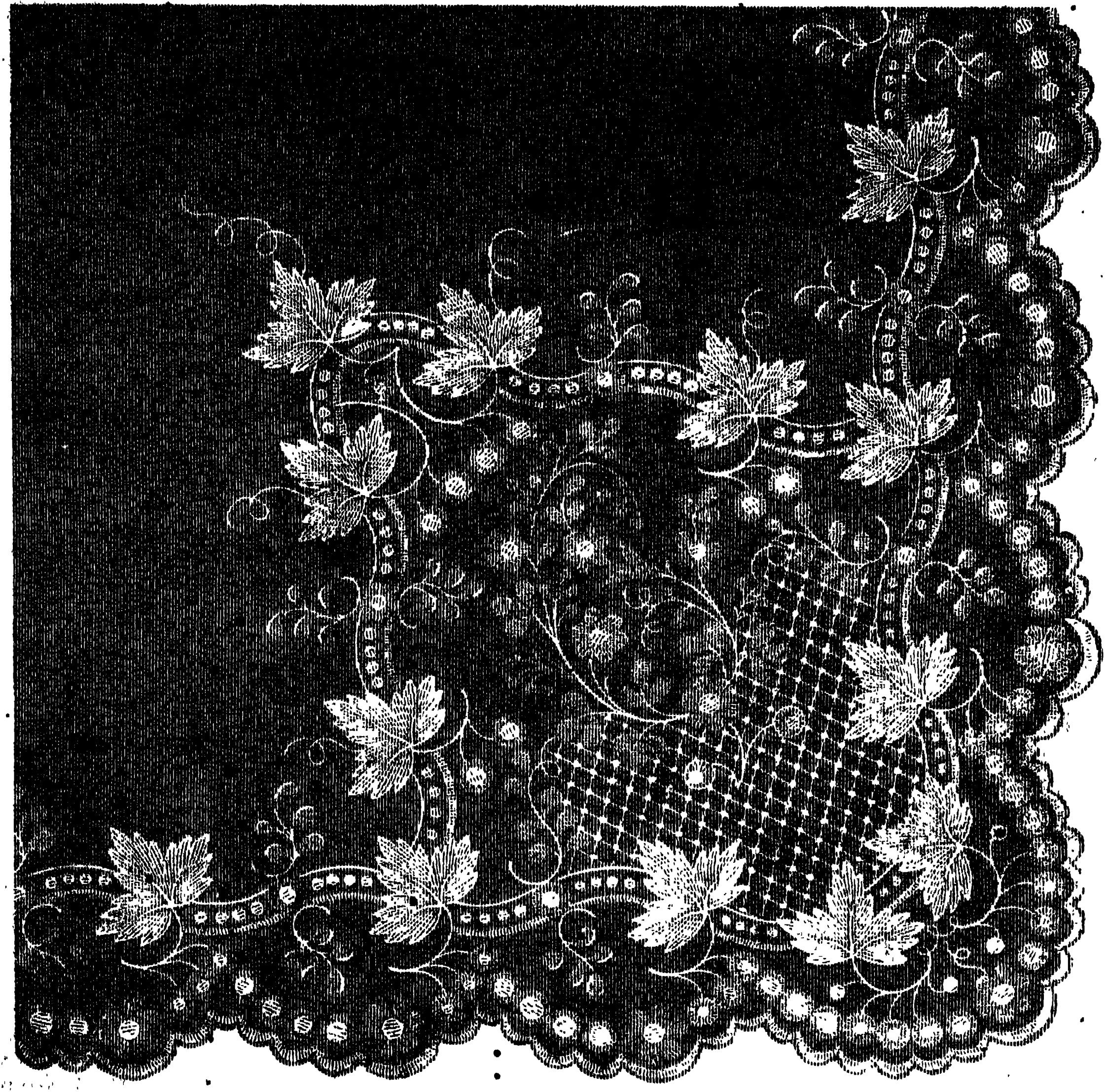
Cataline followed in 1611, but its long speeches, translated from Cicero and Sallust, though they showed its author's learning, prevented its popularity. After the production of a couple of third-rate plays, he was appointed poet-laureate in 1619, and received an annual salary of £100, and a tierce of Spanish wine. He subsequently brought out *The New Inn*, *The Magnetic Lady*, and *The Tale of a Tub*—the last of his dramas which was represented. Several of his other works have perished, but those which have come down to us place him in the first rank of English dramatists—second only to Shakspeare himself. His closing days, in the reign of Charles, were clouded by many embarrassments, which the generosity of James had prevented. In the last scene of his life he is said to have expressed much contrition for his profanation of the sacred name in many of his plays—a sorrow which it is the duty of Christian charity to hope was not in vain. He died on the 6th of August, 1637, and three days afterwards was buried in Westminster Abbey, where so many of the sons of genius are silently slumbering. A monument was to have been raised to his memory, but the troubles of the times immediately following his death prevented it. A plain stone covers his grave, with the simple inscription—*O rare Ben Jonson!*

THE LADIES' DEPARTMENT.

EMBROIDERED HANDKERCHIEFS.

The beautiful handkerchief corners, of which we give engravings, are drawn the full size for working; the materials being a square of French cambric, and white and ingrain red embroidery cotton.

The entire border is to be marked on the handkerchief, with stone-blue, or indigo-blue, in the way described in our instructions in embroidery (see Illustrated Exhibitor, page 48). The outlines are then to be traced, and all the points of the leaves and other parts very accurately formed. In working the design the scarlet and white are to be intermingled; the parts of the engraving which are darkest should be done in red embroidery, and the scallops in the same; or a part of each scallop may be done in white, and the other part in red.



EMBROIDERED HANDKERCHIEF.

The direction of the engraved lines in the leaves and other parts, shows the direction in which the stitches must be taken. The greatest care is requisite, to preserve a smooth even outline to every part, as on that depends much of the beauty of the work. The surface of the raised parts, also, must be smooth and *satin*-like—hence the name of this style of work—*satin-stitch*. The spots are to be raised in the centre, in proportion to their size. The small ones seen within the two waving lines which form the edge, may be worked either in raised stitch or in oyelet holes.

Handkerchiefs worked in colours are suitable only for morning toilette and out-door fêtes; they are embroidered in white, only, for evening wear.

POINT LACE COLLAR.

Materials.—Point lace cottons and Mecklenburgh thread No. 1. A piece of coloured paper, and a bit of alpaca.

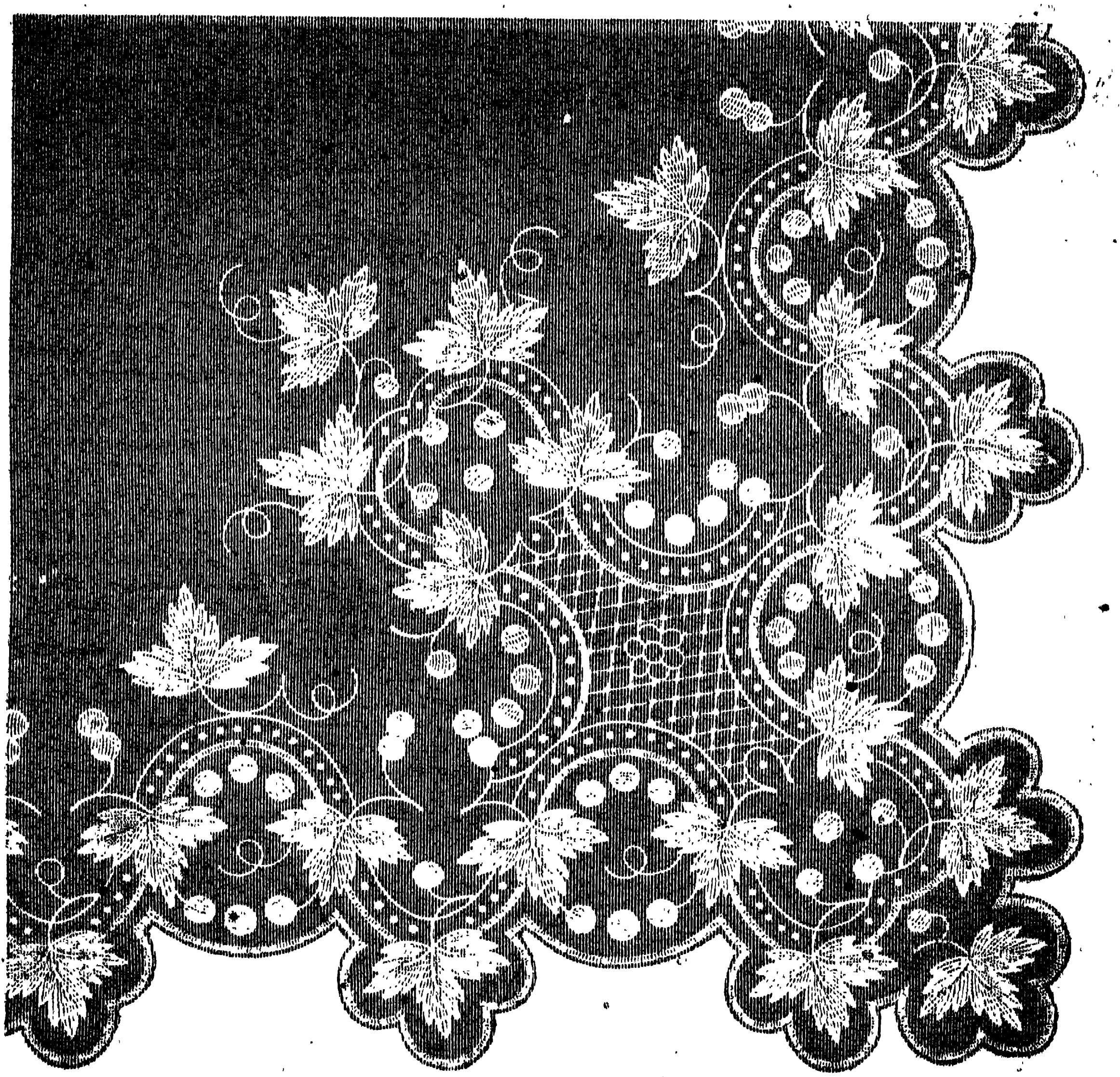
The section given of this collar is of the full dimensions, and from it a perfect one is to be drawn, the design being traced as already described in the instructions for point lace (see Illustrated Exhibitor, page 252). The colour on which it s most pleasant to work is pale green or blue. It is to be lined with alpaca *tacked*, not pasted on.

Each little sprig is complete in itself, and must be perfectly outlined, the ends of the thread being laid on, so that they may be worked in. The scallops (*a*), at the edge, are button-holed over with Mecklenburgh 100, and finished with a Sorrento edge, worked in the same material. The stem of the spray (*b*) is filled in with Brussels lace, in sewing cotton No. 70. The leaves (*c*) are filled in with Valenciennes lace, darned in sewing cotton, No. 150.

The flowers (*d*) have the petals filled in with English lace, and a single spot of the same in the centre. This may be done in sewing cotton No. 90 (*e*). The petals of these flowers are filled with English bars, radiated from the centre, and the finest Mecklenburgh thread should be used for them. These flowers have also a small spot in the centre. The buds (*f*) are all filled with small rosettes, done in cotton No. 90. The entire grounding of the collar is done in bars of button-hole stitch, in Mecklenburgh thread No. 120.

The inner line, forming the neck, is done in a new stitch, which we term braiding stitch. Four threads are laid on in two lines, parallel with each other, and nearly close together. They are then formed into a braid by darning backwards and forwards, always slipping the needle under two threads from the centre. The stitches are taken as close together as possible.

We shall shortly give our readers a design for a chemisette, to correspond with this collar, the illustration of which will appear in our next article on needlework.



EMBROIDERED HANDKERCHIEF.

STATISTICS OF THE FLAX MANUFACTURE OF GREAT BRITAIN.

The flax used in the linen manufactures of this country is supplied partly from our own cultivation and partly from abroad. The quantity annually raised in this country it is difficult to ascertain with correctness. Of the 1,806,673 cwts. of foreign flax imported in 1849, (the date of the last classified official account), 1,352,275 cwts. were imported from Russia; 180,747 cwts. from Prussia; 113,785 cwts. from Holland; 75,769 cwts. from Belgium; 50,940 cwts. from Egypt; 25,455 cwts. from Germany; 2,854 cwts. from Denmark; and the remainder from various sources. In 1852, the total quantity imported was 1,194,184 cwts., a considerable decline on the imports of 1850, which amounted to 1,822,918 cwts.

In the spinning of this flax into thread, and weaving the thread into linen, there were employed in 393 factories, 68,434 people (20,817 males, and 47,617 females) of whom 807 were boys and 774 girls under 13 years of age; 8,012 were males between 13 and 18 years of age; 46,843 females above 13 years of age; and 11,998 males above 18 years of age. The number of spindles employed in spinning the thread was 965,031, and of power looms in weaving the linen 1,141; these spindles and power looms being set in motion by 10,905 horse steam-power, and 3,387 horse water-power. The distribution of these flax factories is as follows:—

England.—Cumberland, 7; Derbyshire, 1; Devon, 1; Dorset, 17; Durham, 3; Gloucester, 3; Hants, 2; Kent, 1; Lancashire, 9; Middlesex, 5; Northumberland, 1; Shropshire, 1; Somerset, 12; Suffolk, 1; Surrey, 5; Westmoreland, 5; Wiltshire, 1; Yorkshire, 60: total, 136.

Scotland.—Aberdeen, 4; Ayr, 3; Edinburgh, 4; Fife, 43; Forfar, 101; Lanark, 4; Kincardine, 7; Perth, 19; Renfrew, 4: total, 189.

Ireland.—Antrim, 38; Armagh, 4; Donegal, 1; Down, 11; Dublin, 1; Kildare, 2; Louth, 2; Londonderry, 2; Meath, 1; Monaghan, 2; Tyrone, 5: total, 69.

The above return of the number of persons employed in the flax factories, especially in those of Ireland, does not give anything like the number of people employed in the linen and thread manufacture, &c., of the kingdom; if we add the hand-loom weavers and persons engaged in the other domestic branches of the manufacture, the total number will be found to be not far short of 300,000.

The importation of foreign linen manufactures in 1851 was as follows:—Lawns (not French) of the value of £2,386; cambrics and French lawns, 26,213 pieces; damasks and damask diaper, 3,821 square yards; plain linen and diaper, and manufactures unenumerated, not made up, of the value of £26,606; sails and articles wholly or in part made up, of the value of £10,307. Of these there were re-exported plain linens and diapers of the value of £5,180.

The export of British manufactured linen goods, &c., in 1851, was 128,780,362 yards of linens of various kinds; 174,901 yards of thread lace; 2,741,265 lbs. of sewing thread; linen goods of other descriptions of the value of £20,004; and 18,518,273 lbs. of linen yarn; the value of the whole amounting to £5,048,615. The United States of America, the Hanseatic towns, China, the West India islands, the South American states, France, &c., are amongst our best customers for linen goods.

In 1710 Ireland exported 1,688,574 yards of linen: in 1850, 75,000,000 yards. In 1825, for every 1,000 pieces of French cambric sold in England, 100 pieces of Irish went into consumption. In 1845, for every 1,000 pieces of French, 16,000 pieces of Irish were sold, although in the interval the duty on the admission of foreign cambric was considerably reduced.

In his lecture before the Society of Arts, March 17, Mr. M'Adam, the secretary of the Royal Belfast Flax Improvement Society, stated the quantity of flax annually produced by the principal flax growing countries to be as follows:—Russia, 150,000 tons; France, 25,000 to 30,000 tons; Belgium, 20,000 to 25,000 tons; Holland, 6,000 to 8,000 tons; Austria, 6,500 tons. The quantity of flax grown in England and Scotland appears to be inconsiderable; but in Ireland, Mr. M'Adam stated that it was progressing rapidly, having increased during the last four years from 53,863 to 138,609 acres, which was equivalent to a yield of 34,000 tons of flax fibre. The value of this crop was estimated at £2,000,000. Mr. M'Adam drew the attention of the meeting to this remarkable fact, that this striking increase was effected in the face of a competition with foreign flax admitted duty free.

THE BANKS OF THE THAMES.

The tourist who directs his attention more to the unfrequented parts of a country, and follows the windings of a river, or an upland valley, rather than the beaten track of former travellers, will have but little cause to repent his determination. He enters into perfect sympathy with surrounding nature, and the silent beauties of the country are particularly refreshing after the noise and bustle of a large city; he passes the lonely cottage of the peasant and the proud and lordly palace; half forgotten battlefields or ruined castles are discovered; and the grey, moss-grown tower of some quiet, peaceful country church, or the majestic spire of a cathedral rise up unexpectedly before him. His steps lead him past the busy factory or the solitary farm—through shady woods and deep silent valleys, and he learns to love solitude for the noble thoughts with which it inspires us, and the habitations of man for the reminiscences of the past.

The sources of the Thames gush from the southern slope of the Coltswood hills in Gloucestershire, within five miles of each other; those which form the slender stream called the Churn are most frequently pointed out as the head springs of the Thames; and they rise at the bottom of a narrow gorge, overhung with shadowy trees. An old woman, who formerly acted as guide to those who visited the spot, was the priestess of this fountain. Presenting her visitors with a glass of pure, sparkling water from the spring, she would say, pointing with her finger—"Here are the seven sources of old father Thames; there are all seven; neither the summer's heat nor the winter's frost affects them; they never increase—never are dried up, but flow on for ever."

Flowing from these seven springs, the Churn passes the ancient "Duro-Carnovium," where three Roman roads met, and which is now corrupted into the modern Cirencester. The ruins of a theatre and of several baths, the evidences of its former importance and splendour, have been uncovered during recent excavations, and it is said that in the cabinet of an antiquary is the skull of a Roman matron, "Julia Costa," though under what circumstances this was discovered is not stated; one thing, however, we know to be a fact, viz., that the superstitious peasants who first possessed it extracted the teeth, as charms against the plague. Near to Cirencester rise the copses of Oakley Grove, where in former times Lord Bathurst received Pope, Swift, Addison, Prior, Gay, and afterwards their successor, the inimitable Sterne.

The stream which flows languidly towards Wiltshire, through sedgy banks, passes a little to the left of the small town of Cricklade—or, in the primitive British form, Cerigwlad—a stony country. The Churn soon joins the classic Isis, and receives several other streams, including the Coln. At Lechlade the growing river becomes navigable for boats of seventy tons. From this point, although the banks are flat, the chains of hills running parallel with the river, draw nearer to it. The little hamlet of Buscott, on the Berkshire side, is a charming specimen of a pleasant, cheerful English village; its little inn peeps from among its flowers and bright-leaved creepers; its rustic church rises from a mass of green trees; the sparkling, sunny water glides, murmuring and "lapping," under the old weather-beaten mill wheels, and like all English villages, has its old hall, and wealthy farms with green pastures and waving cornfields, and pleasant cottages with troops of rosy country children playing round the threshold.

Farther on we find Radcotbridge, where, in 1387, the weak Robert de Vere, the favourite of Richard II., abandoned the army which was under his command, and, as Froissart states, "threw on the river bank his gauntlet, his helmet, the armour which he was unworthy to bear, and swam across the river, flying from the sword of Bolingbroke, afterwards king of England under the title of Henry IV., without having struck a single blow."

Beyond Farringdon we perceive, in the distance, a range of chalk hills. On the slope the gigantic figure of a horse has been cut in the green turf, showing underneath the white chalk. Once each year the country people unite to remove the grass and plants from this space, which otherwise would soon become as green as the surrounding hill sides. This remarkable custom appears to have been handed down from 871, when Alfred the Great defeated the Danes at this spot. A white horse was represented on their standard. The pleasant valley which lies below this hill is called the Valley of the White Horse.

At the confluence of the Cherwell, and where the Isis spreads itself out like a lake of liquid silver, is Oxford, with its square towers and pointed spires, casting the influence of its University over the surrounding country. Its library contains upwards of five hundred thousand volumes, and its spacious colleges and halls can contain five thousand students. In the great amphitheatre, which is able to accommodate three thousand spectators, the emperor Alexander, the king of Prussia, Metternich, Liéven, and Blücher, were received, in 1814, with all honour as *doctors of civil law!*

Below Oxford the river flows slowly through picturesque and well-wooded country; its waters are cut by boats of every kind, and heavy barges are slowly dragged up stream by their straining teams. The towers and domes of Oxford are long seen rising above the elms which line the banks. In the north lie the Blenheim woods; at the east the Chiltern hills, where it is said that a more ignorant, most uncivilised, and most brutish population is to be found than in any other part of England. Lastly, the eye is attracted by the slender spire of Abingdon, once the capital of the Mercian kings, afterwards the residence of the powerful Benedictine abbots, but now a small, quiet, dull town, where the manufacture of sailcloth is carried on.

The church of Clifton looks down upon the river from the summit of an abrupt rock; its picturesque appearance, and the pleasant situation of Dayslock, forming an agreeable contrast to the uniformity of the surrounding country. Lower down the stream we reach Dorcester, the Caic Dauri, or city of the waters, of the ancient Britons, from the fact that it is here that the Thame mingles its waters and its name with those of the Isis. The town itself has decreased in importance since the Saxon times, but a memorial of its former grandeur remains in the stained glass of its noble basilica.

The Thames now flows gently under the bridges of Shillingford and Wallingford; the towns and villages increase in number; almost facing Northstoke is Cholsey, where the remains of an extensive monastery are to be seen, founded in 986, by Ethelred to expiate the murder of his brother, Edward the Martyr. Below the tower of the ancient Benedictine convent at Goring, and near the mill at Clive, the river spreads itself out to enclose in its silver waters a lovely group of islands. The country becomes more lovely at every step; a curious wooden bridge at Pangbourne is a favourite resort of anglers. Somewhat further down, the river pierces the chain of hills, and then turns to the right towards the thick woods of Harwick Hall. A mile lower down it passes Maple Durham, also of the time of the Tudors, with its long avenue, its stretching wings, its pointed gables, and its twisted and quaint chimneys against a back-ground of dark firs and towering poplars. It was among the woods of Purley that Law retired after the failure of his financial schemes.

COOKHAM, ON THE BANKS OF THE THAMES. FROM A PAINTING BY DODSON. ENGRAVED BY H. LINTON.

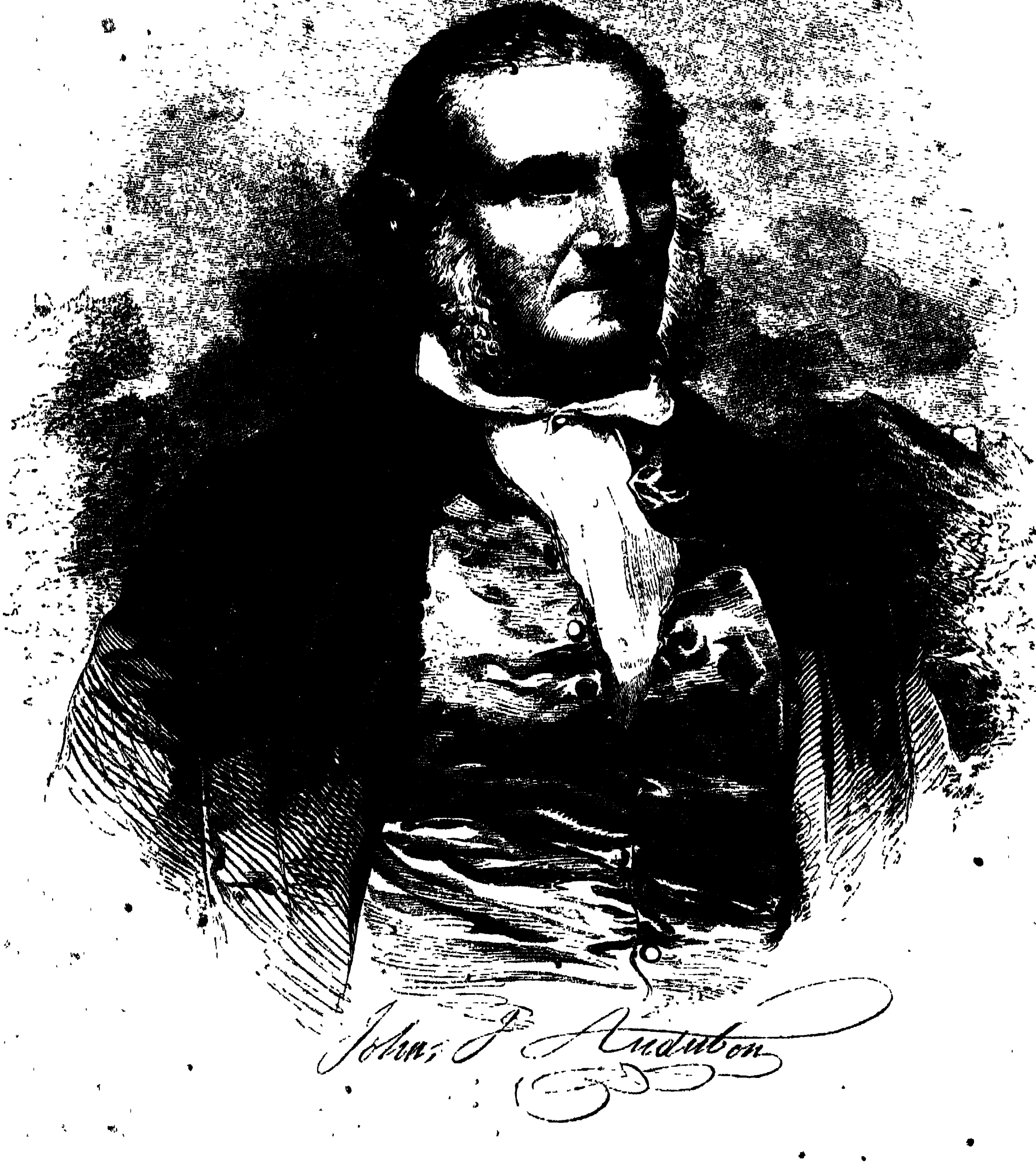
At length we reach the junction of the Kennet and the Thames at Reading, where the Romans founded a colony of the Atrebati, a Gallic tribe from the neighbourhood of Arras; it now contains about nineteen or twenty thousand inhabitants. The bridge at Caversham is a most strange and deformed structure, but exceedingly picturesque; the two counties which it connects are said each to have built its half of the bridge without reference to the other. The Oxfordshire end is of stone and brick; that on the Reading side a skeleton of iron and wood.

As we leave Reading, the straight lines and embankment of the railway which defaced the landscape are left behind; meadows again stretch around us, and the pleasant village of Sonning, with its old church spire and its flowering shrubberies stands side by side with the stately trees of Holme Park. The river which had separated above the bridge to embrace two or three islands, now receives, near Striplake, the Loddon. Then passing the old and irregular houses of Wargrave, we come to Park Place, built by the duke of Hamilton, and inhabited at different times by George III. and George IV.; it stretches its green mounds, and copses, and fresh flowers over a considerable extent; and the grounds are filled with grottos, with ruins of every age, and a druidical temple was even transported at great expense from the island of Jersey.

Surrounded by a girdle of hills covered with beech trees, we next see Henley-on-Thames, one of the most ancient towns of this part of the county—as indeed its name shows, being the two British words, *hen*, old, and *ley*, place. The present houses, however, are all modern, excepting the church, which dates from the fourteenth or fifteenth century, and which contains among others the ashes of the celebrated Dumouries, who died in this neighbourhood in 1828.

After the hamlet of Danesfield, where the traces of a Danish encampment are still plainly visible, we pass the splendid woods and the grey tower of Bisham; gliding under Marlow bridge, we see before us the pleasant village of Cookham, on the Berkshire side, rising from a small wooded eminence, while to the left the hills of Buckinghamshire gradually stretch away into the distance.

JOHN JAMES AUDUBON, THE AMERICAN NATURALIST.



The sublime scenery and luxuriant vegetation of North America not only delight the tourist, but seem to make a love of nature racy of the soil. We can hardly wonder, then, that one of the greatest, if not *the* greatest naturalist the world has ever seen, should have arisen in the midst of that vast continent.

John James Audubon was born in Louisiana about the year 1782. He was of French descent, and gave early manifestations of his taste for natural history. Birds, above all, exercised a sort of fascination over him. No amusements or pleasures that his family or friends could offer possessed half the attraction for him that was to be found in roaming in the woods and listening to the song of the warblers. His father took him with him frequently when making excursions to distant parts of the state, and was always careful to direct his attention to rare flowers and beautiful birds, pointing out to him the variegated plumage of the latter, and speaking to him of their instincts, their mode of life, migrations and pleasures, and changes of colour at various periods of the year.

The child was delighted, and the tastes thus encouraged grew with his growth, and strengthened with his strength. He has recounted in glowing terms the delightful impressions which these rambles of his infancy made upon him. The desire to preserve the beautiful appearance thus presented to him, which from their very nature were fleeting and evanescent, was early awakened, and led him to apply himself to learn drawing. This was at first but a boyish fancy, but it soon became a passion. Though many of his sketches were of course at first little better than caricatures, the very imperfections of the copy led him to admire the original the more, and encouraged him to persevere in his efforts. When he was fifteen years of age he was sent to Paris to complete his education; and while there he received lessons during two years from the celebrated David, commencing with the study of the human figure. While at Nantes he formed an acquaintance with a young Frenchman, with whom he entered into partnership with the intention of carrying on business in America. A very characteristic anecdote is related of the way in which they employed themselves previous to their departure. Whilst his friend was busy in filing accounts, making out bills of lading, invoices, &c., Audubon occupied himself in cleaning his gun, and providing a plentiful supply of paper and crayons. It may be readily imagined that where there was so little community of sentiment, a community of property and pursuits could not last long; so that the partnership was soon dissolved.

Upon his return to America he was eighteen years of age, and his father gave him a farm near Philadelphia, where the Perkiomming Creek falls into the Schuylkil. Here Audubon, freed from the irksome cares of the counting-house, gave himself up entirely to his favourite employment—roaming through the woods in the neighbourhood, and the vast plains and hills, crowned with eternal verdure, which offered multitudinous subjects for his pencil. His excursions, he tells us, invariably commenced at dawn; and to return in the evening wet with dew, and carrying a feathered prize, formed one of the sweetest pleasures of his life.

It might be readily supposed that one who sought happiness only in the pathless woods, and thought the songs of the wild birds the finest of music, could have but little taste for domestic pleasures, and but little inclination to tangle himself in the silken coils of love. And yet, here was another proof of the thousands that have appeared since the world began, and will continue to present themselves till it ends, that no pursuits or pleasures, toils, or ambition, or triumphs, can make the heart of man cast off its allegiance to the gentler sex. Audubon married early. "Nature," says he, "which had inclined my heart towards the birds and flowers, had not rendered it insensible to softer influences. It is enough for me to add that the object of my affections has now for a good while past given me the name of her husband." This, however, is the only allusion to his marriage.

Immediately after his marriage he went to live at Louisville, in Kentucky, below the rapids of the Ohio. He remained here two years, occupied in his favourite studies. He sketched all the birds he could meet with, and took notes. His fame spreading, a great many sportsmen in the neighbourhood shot specimens, both birds and quadrupeds, and sent them to him, so that his collection increased daily; and he had at last more than two hundred drawings of various animals. He was thus engaged in March 1810, when Wilson, the celebrated author of the "American Ornithology," one morning entered the counting-house in which Audubon spent his time in sketching and his partner in keeping their books. He gave evident signs of astonishment when he saw the way in which the former was engaged; but he, nevertheless, walked forward to the table at which he sat, and stated without hesitation the object of his visit, which was to induce him to become a subscriber to his work, and favour him with his patronage. Audubon was surprised and delighted with the engravings, and after turning over the leaves of the portfolio, was about to add his name to the list, when his partner said abruptly—"*Mais mon cher Audubon, qui vous pousse à souscrire? Vos dessins sont meilleurs que ceux-là, et vous devez mieux connaître que ce quidam les mœurs et l'histoire des oiseaux d'Amerique*"—"My dear Audubon, what induces you to subscribe? Your drawings are better than those, and you surely know more about the habits and history of the American birds than this fellow." Whether Wilson understood French or not, is not known; but he evidently saw what was meant, for he instantly lost his cheerfulness, and became silent and reserved. Audubon, however, did all he could to soothe him. He lent him some of his drawings, and went for a day's shooting with him in the neighbourhood. Wilson lodged in the house, a part of which was occupied by Audubon and his family, and every evening he was heard playing Scotch airs on his flute alone in his room. The American was touched by his lonely situation, introduced him to his wife and many of his friends, and gave him a list of American birds written out with his own hand; but all was not sufficient to heal Wilson's wounded pride: and he states in his diary, that "literature and art had no friend in the place."

Audubon, years after, had reason to regret, and doubtless did regret, his cool reception of the poor Scotchman, when he himself was wandering, portfolio and subscription list in hand, and seeking the same patronage and support which he had then denied.

A few months after Wilson's departure, Audubon moved farther up the Ohio, nearer to the wild forests of the far west. He fixed his residence at Henderson, a village which then contained only six or eight houses. One of them, which however was only a very small log hut, was luckily empty; and in this, with his young wife and infant son, he took up his abode. All around was a dense forest, no market near, and nothing to be had for money; but the neighbours were kind, and brought them plenty of flour and smoked hams, and did whatever else was in their power to make them comfortable. A happier couple than he and his wife at this time never existed—no care or misgiving ever troubled them. They roamed together in the woods, he with his gun on his shoulder, and often leading his child by the hand, or carrying him in his arms. Business was now totally neglected, and the livelong day passed in shooting and fishing. He made a retreat on the top of his house for the swallows and martinets, to serve them at the period of immigration.

He had now for nearly twenty years submitted impatiently to the drudgeries of commerce, but he was unable any longer to control his inclination; and he therefore, in spite of the prayers and entreaties of his family and friends, resolved upon bidding adieu for a season to the delights of home, and completely abandoning himself to a nomade life in the forests. He set out with a valise on his back, containing his diary, his colours, and his brushes and pencils, and a small supply of linen, which he made use of when required to furbish his fowling-piece, and plunged into the prairies. Not only has he painted and described the numerous species of birds which inhabit the vast continent which extends from Mexico to Labrador, but in five thick volumes he has given lively and picturesque sketches of the strange characters and the strange incidents which he encountered on the way, and graphic descriptions of the sublime scenery which everywhere astonishes and delights the tourist in the far west. He slept by night at the foot of a tree, killed game and cooked it for his subsistence, and floated down hundreds of miles along mighty rivers in a frail canoe, sketching as he went—everywhere braving fatigue and disappointment with dauntless courage. But he had as yet no idea of publishing his work. All this labour was undergone under the influence of pure enthusiasm.

It was only in April, 1824, that having met with the celebrated ornithologist, Charles Lucien Bonaparte, at Philadelphia, and having been presented by him to the Natural History Society of that town, that he first experienced the desire of fame. His drawings were greatly admired in Philadelphia and New York; but he did not remain long to enjoy the praise which they elicited. He started thence to visit the great lakes of the north; and it was in the silence and desolation of the vast forests on their shores that he first thought of giving the results of his labours to the world. "Happy days! happy nights!" he exclaims in his journal, when, revelling in dreams of future glory by the light of his lonely watch-fire, he ran through his collection, asking himself proudly, how would one man, without assistance, without reputation, without literary or scientific connexions, be able to carry out a plan so vast and extensive, to publish immense drawings, in which not only each bird should be reproduced as large as life, but every part of the bird,—beak, feet, legs, talons, all laid down by the aid of the compass with mathematical accuracy? Flowers, plants, insects, reptiles, fishes, had all been faithfully copied from nature in every particular. Difference in form or size had led him in the beginning to divide his collection into three classes; but he now made a further division into books of five plates each, and advancing still farther westward, determined to leave nothing wanting to the success of his work, which time, perseverance, and labour could accomplish.

Eighteen months afterwards he returned to his family, who were now in Louisiana; and after having explored the forests in that neighbourhood, and in vain endeavoured to procure subscribers in the chief towns of the Union, or induce the American artists to undertake the engraving of his designs, he determined with a heavy heart to try his fortune in Europe. He therefore embarked for England in May, 1826.

His first impressions of England were anything but agreeable. He had numerous letters of introduction, but still considering every European far superior to the Americans in matters relating to literature and art, he looked upon himself as lost in the crowd; and he states that as he traversed the streets of Liverpool, without meeting with one friendly glance, his heart sunk within him. But on presenting his letters of introduction, his prospects began to brighten. His drawings were exhibited to the public, and loudly praised in the newspapers. He was received with great favour and eclat in Manchester and other great towns. In Edinburgh his reception was enthusiastic. Upon going there, he put his drawings into the hands of the engraver, although he had not as yet one subscriber. On leaving the northern Athens he had obtained the names of sixty-five of its aristocracy, thus enabling him to count upon £16,000 for a work which had only just been commenced.

All now went on prosperously. After a tour through England and Scotland he paid a visit to Paris in 1828, where he was received with open arms by the scientific world. Cuvier said "that his work was the most gigantic and most magnificent monument that had ever been erected to nature." The ensuing winter was passed in London, and in April, 1829, he returned to America to explore anew the woods of the middle and southern states. Accompanied by his wife, he left New Orleans on the 8th of January, 1830, for New York; and on the 25th of April, just a year from the time of his departure, he was again in the great metropolis. Before the close of 1830 he had issued his first volume, containing one hundred plates, representing ninety-nine species of birds, every figure of the size and colours of life. The applause with which it was received was enthusiastic and universal. The kings of England and France had placed their names at the head of his subscription list; he was made a fellow of the Royal Societies of London and Edinburgh; a member of the Natural History Society of Paris, and other celebrated institutions.

On the 1st of August, 1831, Audubon arrived once more in New York, and having passed a few days with his friends there and in Philadelphia, proceeded to Washington, where the president and other principal officers of the government gave him letters of assistance and protection to be used all along the coast and inland frontiers where there were collectors of revenue or military or naval forces. He had previously received similar letters from the king's ministers to the authorities of the British colonies.

Proceeding at length upon his mission, he explored the forests of Maine and New Brunswick, and the shores of the bay of Fundy, and chartering a vessel at Eastport, sailed for the gulf of St. Lawrence, the Magdalen Islands, and the coast of Labrador. Returning as the cold season approached, he visited Newfoundland and Nova Scotia, and, rejoining his family, proceeded to Charleston, where he spent the winter; and in the spring, after nearly three years' travel and research, sailed a third time for England.

The second volume of "The Birds of America" was finished in 1834, and in December of that year he published in Edinburgh the second volume of the "Ornithological Biography." Soon after, while he was in London, a nobleman called upon him, with his family, and on examining some of his original drawings, and being told that it would still require eight years to complete the work, subscribed for it, saying, "I may not see it finished, but my children will." The words made a deep impression on Audubon. "The solemnity of his manner I could not forget for several days," he writes in the introduction to his third volume; "I often thought that neither might I see the work completed, but at length exclaimed, 'My sons may;' and now that another volume, both of my illustrations and of my biographies, is finished, my trust in Providence is augmented, and I cannot but hope that myself and my family together may be permitted to see the completion of my labours." When this was written, ten years had elapsed since the publication of his first plate. In the next three years, among other excursions, he made one to the western coast of the Floridas and to Texas, in a vessel placed at his disposal by government; and at the end of this time appeared the fourth and concluding volume of his engravings, and the fifth of his descriptions. The whole comprised four hundred and thirty-five plates, containing one thousand and sixty-five figures, from the bird of Washington to the humming-bird, of the size of life, and a great variety of land and marine views, and floral and other productions, of different climates and seasons, all carefully drawn and coloured after nature. Well might the great naturalist felicitate himself upon the completion of his gigantic task. He had spent nearly half a century "amid the tall grass of the far-extended prairies of the west, in the solemn forests of the north, on the heights of the midland mountains, by the shores of the boundless ocean, and on the bosoms of our vast bays, lakes, and rivers, searching for things hidden since the creation of this wondrous world from all but the Indian who has roamed in the gorgeous but melancholy wilderness." And, speaking from the depth of his heart, he says, "Once more surrounded by all the members of my dear family, enjoying the countenance of numerous friends who have never deserted me, and possessing a competent share of all that can render life agreeable, I look up with gratitude to the Supreme Being, and feel that I am happy."

In 1839, having returned for the last time to his native country, and established himself with his family near the city of New York, Audubon commenced the publication of "The Birds of America" in imperial octavo volumes, of which the seventh and last was issued in the summer of 1844. The plates in this edition, reduced from his larger illustrations, were engraved and coloured in the most admirable manner by Mr. Bowen, of Philadelphia, under the direction of the author.

Audubon was too sincere a worshipper of nature to be content with inglorious repose, even after having accomplished in action more than was ever dreamed of by any other naturalist; and while the "edition for the people" of his "Birds of America" was in course of publication, he was busy amid the forests and prairies, the reedy swamps of the southern shores of America, the cliffs that protect the eastern coasts, by the currents of the Mexican Gulf and the tide-streams of the Bay of Fundy, with his sons, Victor Gifford and John Woodhouse, making the drawings and writing the biographies of "The Quadrupeds of America," a work in no respect inferior to that on birds.

Audubon's highest claim to admiration is founded upon his drawings in natural history, in which he has exhibited a perfection never before attempted. But he has also indisputable claims to a respectable rank as a man of letters. Some of his written pictures of birds, so graceful, clearly defined, and brilliantly coloured, are scarcely inferior to the productions of his pencil. His powers of general description are also remarkable. The waters seem to dance to his words as to music, and the lights and shades of his landscapes show the practised hand of a master. The evanescent shades of manners also, upon the extreme frontiers, where the footprints of civilisation have hardly crushed the green leaves, have been sketched with graphic fidelity in his journals.

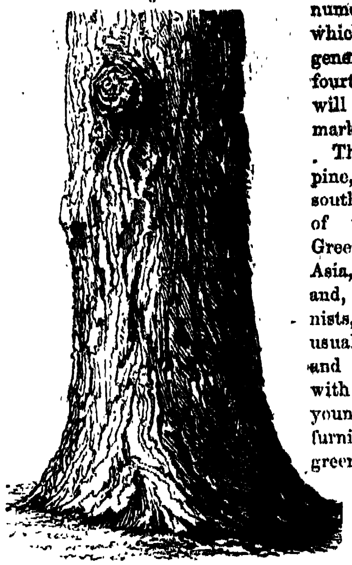
After his many travels, Audubon died peaceably at his residence in New York, on January 27, 1851. He had arrived at a ripe old age. Two sons survive to deplore his loss, and to prosecute the science in which the father won such fame.

THE FIR.

The fir tree, which belongs to the genus *Pinus*, was well known to the ancients, and has been described and celebrated by their philosophers and poets. Pliny, in his Natural History, minutely describes six species of it; and Virgil refers to it in his account of the wooden horse used by the Greeks at the siege of Troy.

> "A huge horse made, hye raised like a hill,
> By the diuine science of Minerua;
> Of clouen *firr* compacted were his ribs."
> (*Surrey's Translation.*)

Fig 1.



It is referred to, likewise, in several places by Horace, Ovid, Statius, and Catullus. The numerous varieties of the tree which compose the genus are generally embraced within fourteen species, of which we will mention the most remarkable.

The *Pinus pinaster*, or wild pine, is indigenous to the south of Europe, both shores of the Mediterranean, to Greece, the western parts of Asia, Himalaya mountains, and, according to some botanists, even to China. It usually attains a great height, and has a straight fair stem, with a rough bark. When young, its branches are thickly furnished with leaves of a sea-green colour, which give to the tree a very pleasing appearance. Its cones, which are thick, roundish, and hard, are covered with flat scales arranged with beautiful regularity and precision. The most remarkable fact in the history of this tree is the great use which has been made of it in France in covering immense districts of barren sand. One of these plantations (which are called pignadas) lies between Bordeaux and Bayonne, and constitutes the principal source of wealth to the inhabitants of the district, who are almost entirely supported by the preparation of resin and tar from fir trees of this species.

The *Pinus pinea*, or stove pine, which is a tall evergreen tree, is a native of the south of Europe and the north of Africa. It prefers a sandy loam, but will grow readily in almost any description of soil. Its kernels are eatable, and are even preferred by some to almonds. Its cones are ovate obtuse, and nearly equal in length to the leaves.

The *Pinus sylvestris*, commonly called the Scotch fir. This tree is very common throughout Scotland, but is also found in most other countries of Europe. It grows indifferently in the temperate, frigid, and torrid zones. Its wood, which is red or yellow deal, is the most durable of any of the fir tribe yet known. Mr. Loudon, in his *Arboretum Britannicum*, mentions some instances in which this kind of tree has attained a very large size. At Dalmeny Park, near Edinburgh, there is one sixty feet in height, of which the trunk is three feet in diameter, and the head, or body of the tree, thirty-six feet. He mentions another at Cypress Grove, near Dublin, whose height is seventy-five feet, and the diameters of its trunk and head three feet six inches and fifty feet respectively. At Charleville, in King's county, is a third, of still greater dimensions. In favourable situations, however, it frequently attains a height of from eighty to one hundred feet, the trunk varying in diameter from two to four feet. Its head is somewhat conical or rounded, but, as compared with the heads of broad-leaved trees, it is generally narrow in proportion to its height. The trunk, which grows almost perpendicularly, is covered with a thick, rough bark, as seen in the engraving

Fig. 6.

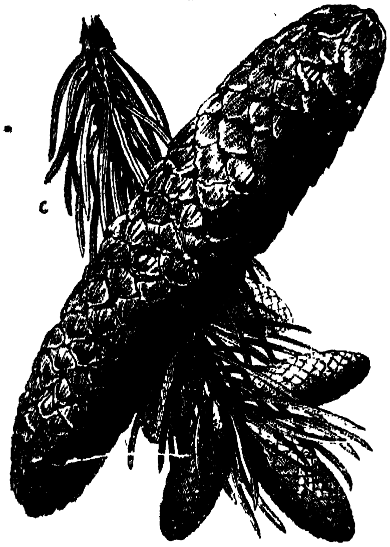
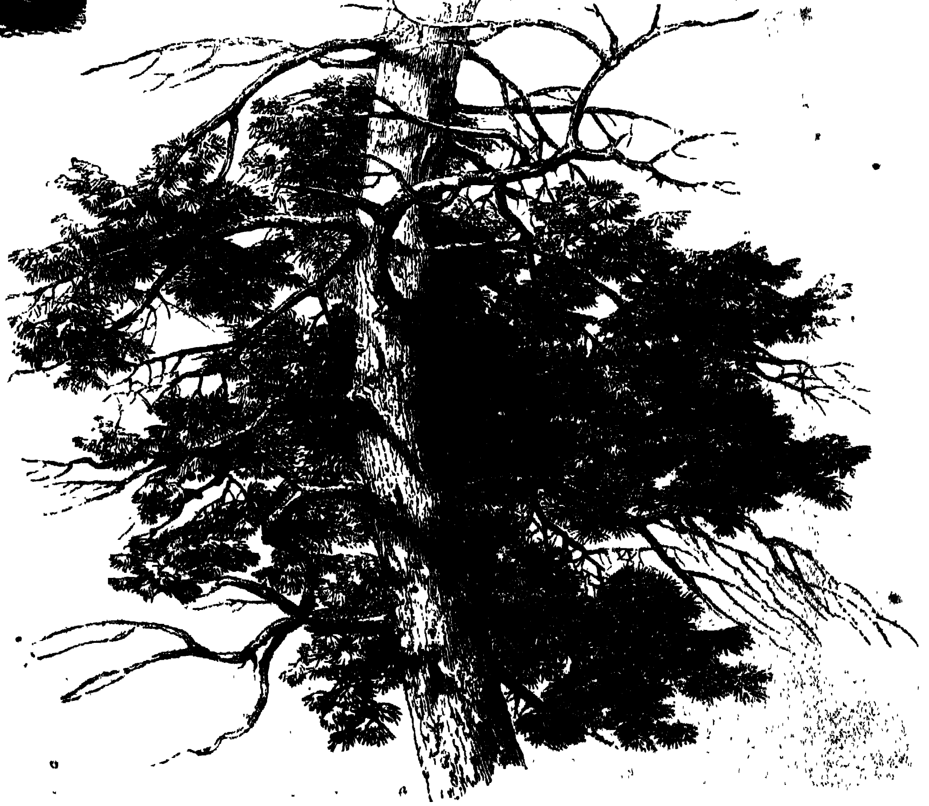


Fig. 2.



(fig. 1). The knarled and irregularly clothed appearance of its branches is well shown in woodcut (fig 2), which represents a section of the tree with the branches and foliage as they usually appear. The delicate, needle-like form of the small leaves is shown on a large scale in woodcut (fig. 3), which represents a small branch of this species of fir with the cone and bloom attached. Trunk, branches, and foliage, however, have a dark, murky hue, which gives to the tree anything but a pleasing appearance.

Mason somewhere says of it:—

> ———" The Scottish fir in murky file,
> Bears his inglorious head, and blots the fair horizon."

Wordsworth, too:—

> "Unheeded night has overcome the vale:
> On the dark earth the baffled vision fails:
> The latest lingerer of the forest train,
> The lone black fir, forsakes the faded plain."

The *Pinus picea*, or yew-leaved fir, is a tall evergreen tree and a native of the mountains of Siberia, Germany, and Switzerland. Its leaves are solitary, flat, and somewhat two-ranked; the cones are cylindrical, erect, and thickly covered with long pointed scales. A curious fact in connexion with this tree is mentioned by Gmelin, who asserts that forests of it are considered by the tribes of wandering Tartars as sure indications of good springs and pasture ground, as it grows best in moist rich soil, an obstacle, by the way, to its being much planted in England. This species includes the silver fir and the balm of Gilead fir. The former of these is a noble, upright tree, which will grow in any soil or situation, though it attains its largest size in rich loamy earth. The balm of Gilead fir is perhaps the most valued of the whole genus, for the great fragrance of its leaves, and the extreme beauty of its branches, which are thickly covered with their rich balmy foliage. Its cones differ but slightly in colour and shape from those of the silver fir. The average period of its age is about twenty years; nor will it reach even that limit, unless planted in a deep rich soil.

Fig. 7.

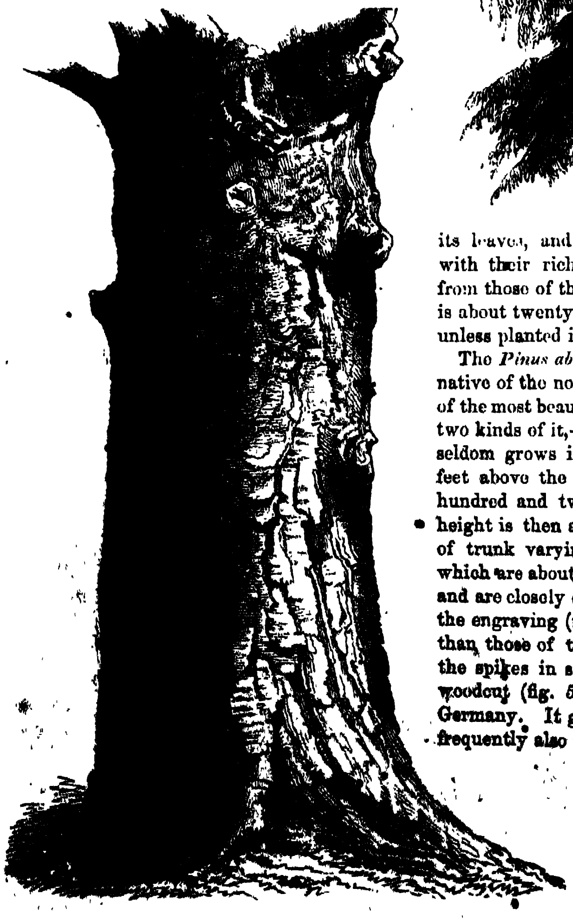


Fig. 8.

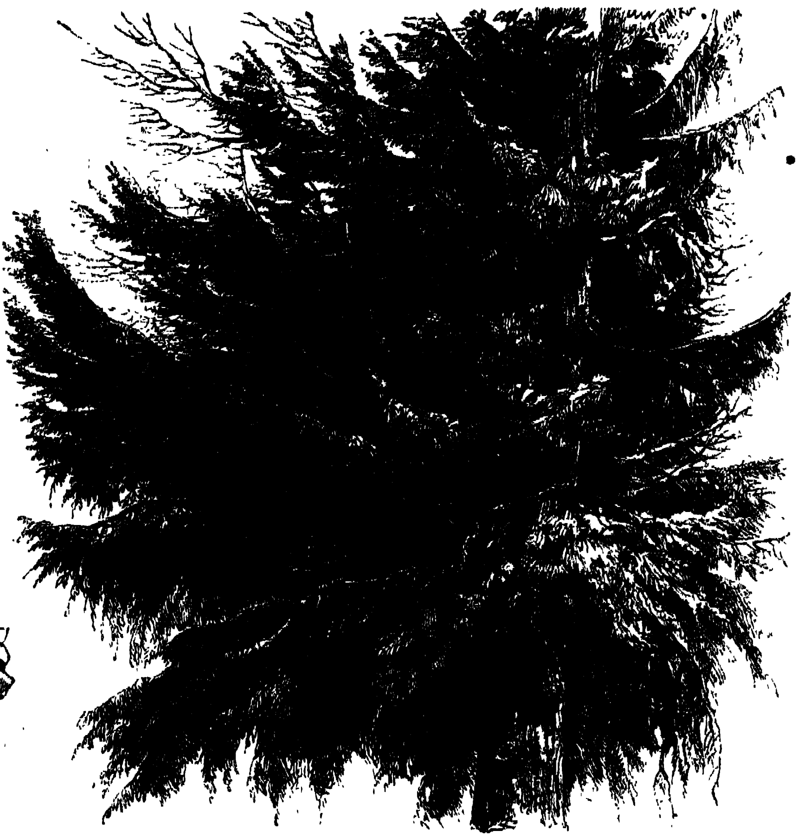
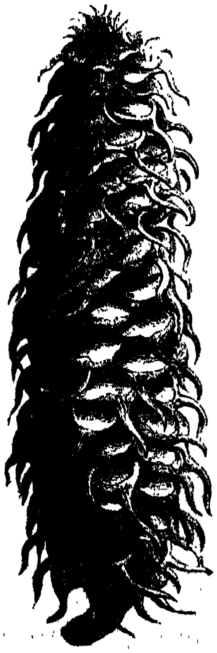


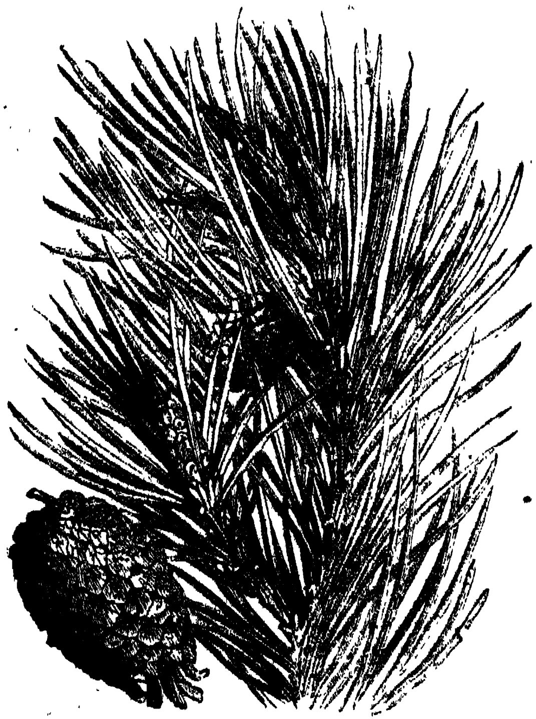
Fig. 4.



The *Pinus abies*, or spruce-fir. This tree, which is a native of the northern parts of Europe and of Asia, is one of the most beautiful and lofty of European firs. There are two kinds of it,—the white fir and the red fir. The former seldom grows in a situation of less than three hundred feet above the level of the sea, and requires about one hundred and twenty years to attain its full size. Its height is then about one hundred feet, with a diameter of trunk varying from three to four feet. The cones, which are about six inches long, are cylindrical and erect, and are closely covered with flat, prickly scales, as seen in the engraving (fig. 4). The leaves are broader and thicker than those of the other species, and are arranged round the spikes in single and double rows, as shown in the woodcut (fig. 5). The red fir abounds in the north of Germany. It grows singly in mountainous districts, but frequently also in large forests. Its shape is conical, and its leaves, which are of a dark green colour, are four-cornered and prickly. Its cones, as seen in the engraving (fig. 6), are cylindrical and cased in flat blunt scales.

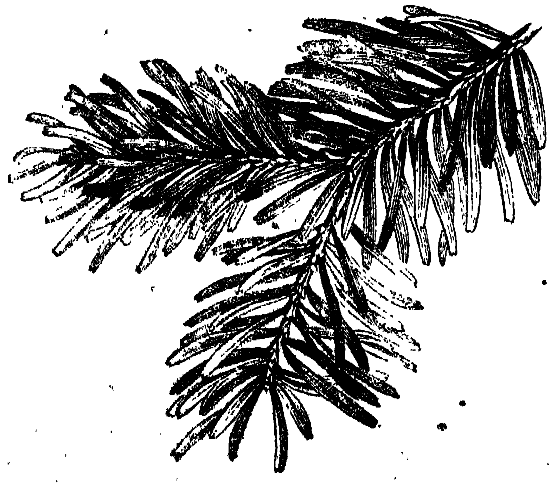
The average age of this tree, as also of the white fir, is about four hundred years. The greatest height which it usually attains is one hundred and eighty feet, with a proportionate thickness of trunk. Its rind is of a reddish-brown colour, and in old trees becomes cracked and scaly, as seen in woodcut (fig. 7). The illustration (fig. 8), which represents a section of the trunk with

Fig. 3.



its branches and foliage, gives an accurate idea of the general appearance of this very handsome tree. The balm, or hemlock

Fig. 5.



fir of North America is, by some botanists, considered a member of this species.

We reserve a brief description of the other principal species of the fir for a future number.

THE DAISY.

'Tis Flora's page; in every place,
In every season, fresh and fair,
It opens with perennial grace,
And blossoms everywhere.

On waste and woodland, rock and plain,
Its humble buds unheeded rise;
The rose has but a summer's reign,
The daisy never dies.

MONTGOMERY.

THE ELECTRICAL EEL.

THE governor of New Amsterdam had a large electrical eel, which he kept for several years in a tub made for that purpose, and placed under a small shed near to his house. Two sailors, wholly unacquainted with its properties, were, one day, told to fetch an eel which was lying in a tub, and to give it the cook to dress for dinner. No sooner had they reached the shed than one of them plunged his hand to the bottom of the tub to seize the eel, when he received a blow which benumbed his whole arm; and without knowing how this could be, he started from the tub, shaking his fingers, and holding his elbow with the hand of his other arm, cried out, "I say, Jack, what a thump he has fetched me with his tail!"

His messmate, laughing at "such a foolish notion" as a violent blow from the tail of an eel, next put down his hand to capture the animal, but he, receiving a similar shock, also snapped his fingers, and ran out exclaiming, "Why, he did give you a thump! He's a fighting fellow: he has fetched *me* a broadside too! Let's both have a haul at him together, Jack; then we shall board his slippery carcase in spite of his rudder." Accordingly, they both plunged their hands into the tub, and seized the eel, fully grasping it around the body. As this was rougher treatment than the animal commonly experienced, he returned it with a most violent shock, which caused the sailors instantly to quit their hold. For a moment they stood aghast, then rubbing their arms, holding their elbows, and shaking their fingers, they capered about with pain and amazement, declaring that their arms were broken, and that the Evil One must be in the tub in the shape of an eel. They were now persuaded that it was not a simple blow of the tail they had felt before; but they could not be prevailed on to make another attempt to take out the fish, but stole away, abusing the trick about the cook and the eel.

Some years ago, the writer saw the electrical eel, exhibited at the Adelaide Gallery, give one of the visitors a tremendous shock. The celebrated professor Schonbein, the inventor of gun-cotton, also tried its power. "I endeavoured to endure it," he says, with *sang froid;*" but it seems to have caused him so to contract his countenance, and to make such curious gestures, that his friends standing by burst into loud peals of laughter. A few days before this, Captain Basil Hall, and a life-guardsman, who came on the boards with his sword and cuirass, were alike laid prostrate by a shock. And to mention only one more instance, when six or seven persons joined hands, the one at the extremity of the line near the tail touching that part, while the one near the head touched that also, the whole party felt a succession of shocks, which caused them to jump and scream, and deprived them of all inclination for another experiment.

The organ of the eel which produces such singular effects, occupies the under-part of the tail, or terminal portion of the body, and consists of four longitudinal masses, two large ones above, and two small ones below. Each mass is composed of a vast number of membraneous laminæ, or thin plates, closely set together, and nearly horizontal. These plates have their external margin affixed to the skin, and they rise to a level with the vertebral column; they are also united to each other by an infinite number of small transversal plates, and thus a multitude of transverse cells is formed. These cells are filled with a gelatinous matter, abundantly supplied with nerves, and on these nerves depend the eel's electrical power. But how, or in what manner, an accumulation of the electrical fluid takes place, or how it is that the animal discharges it, and that in any direction at its pleasure, are questions which, at present, we have no means of resolving. Here is one of innumerable instances in which we are stopped by impassable barriers in the progress of our investigations among the wonders with which the great field of creation teems. How soon do we discover the limitation of our faculties, and their inadequacy to grasp but a small part of the ways and workings of the Almighty!

But why, it may be asked, has the eel this electrical power? To this it may be replied, As the means of securing its natural prey. Only let live fish be put into the tub in which the eel swims about, and let it be disposed to have a meal, and by a discharge of its artillery they are instantly killed, and are swallowed at its pleasure. Its power of making this discharge has been repeatedly proved to be under its own control. In wounded animals, it is usually more feeble, and sometimes it appears to be reduced to the lowest degree. But it is not always so; for it has occasionally happened that persons have handled an apparently exhausted eel for some time, without any shock being experienced, when all at once its battery has been discharged with the greatest effect. Several times Humboldt was bold enough to hold one of these fishes by the tail, and even to pinch it; yet he received no shock till his fellow-traveller, Bonpland, tickled it on the belly, or on the gill covers. At this crisis the shock to Humboldt was terrible, while Bonpland was conscious of no sensation. When two persons touch at once the space occupied by the electric apparatus, their fingers being two inches apart, it is seldom that both are affected by the electrical explosion at the same time. It depends, indeed, on the will of the animal to which of the objects touching it it should direct the electric fluid, or, still more strange to say—whether it will call up this or that portion of its electrical battery into action. When two persons touch the eel, each with a metallic rod, and bring the ends of the rod on the body of the animal to within five or six lines of each other, both are not affected simultaneously, for the eel discharges its electricity first through one rod, and then through the other, giving a shock to each holder in succession. It is found that when tickled on the under surface, on the pectoral fin, on the lips, eyes, and especially the gill covers, that the animal gives the most violent concussions. These parts seem to be peculiarly sensitive, and the skin over them is very delicate.

That the electricity in action is the ordinary electricity, is proved by its producing the same effects. One evidence is afforded by the shocks it produces. "I never remember," says Humboldt, "to have experienced a more terrible blow from the discharge of a Leyden jar of great size than one which I received on putting my two feet on an electrical eel which was dragged out of the water. During the rest of the day I felt great pain in the knees, and in almost every joint of my body. A blow on the stomach, a stone falling on the head, a tremendous electric explosion, produce in an instant, the same effects: nothing is distinguished, all is vague, when the whole nervous system is thus shocked violently at the same moment." The writer has seen other phenomena arising from the active power of the eel—as the electrical spark and the deflagration of gold leaves, these leaves being mutually attracted from a sensible distance, and actually burning on coming into contact.

THE PARTING OF HECTOR AND ANDROMACHE.

THIS beautiful episode is well known to the readers of Pope's "Homer's Iliad;" but in order to give those who are unacquainted with Greek an opportunity of reading it out of its poetic dress, and of thereby ascertaining for themselves the noble simplicity and exquisite tenderness of the original, a plain English version of the passage is subjoined. Occasionally, it must be premised, a word or two occurs in the Greek, of which there is no direct English equivalent.

Andromache addresses Hector (Book VI. 407):—"Rash man, thy courage will be thy ruin; thou hast no pity for thy infant boy nor for me unhappy, who will soon be thy widow. Soon will the Achæi in a body fall on thee and slay thee; but for me it would be better after such a loss to lie in my grave, for no comfort shall I have when thou hast met with thy fate.* In sooth, Achilles, sprung from Jove, slew my father, and plundered the well-built city of the Kilikes, Thebe with lofty gates; he slew my father Eetion, but he robbed him not of his armour; he feared to do this. He burnt his body with his cunningly-wrought armour, and over him he raised a mound of earth, around which the nymphs of the mountains planted elms, the nymphs the daughters of Jupiter with the Ægis. Seven brothers, too, I had in my father's house, and all perished in one day, for Achilles, swift of foot, slew them while tending the oxen with crooked hoofs and the white-fleeced sheep. My mother, who was a queen in woody Hypoplacus, Achilles, after he had brought her here with all our possessions, set free for a large ransom; and she died by the arrows of Artemis (Diana) in the house of my father. But thou, Hector, art to me both father and revered mother and brother, thou art my noble husband. Come now, take pity on me, and stay here on the battlements, and make not thy son an orphan and me a widow. Place thy people here by the wild fig-tree, where the city is most assailable, and the wall most open to attack. Thrice have the bravest come and made an onset here, the two Ajaxes, and far renowned Idomeneus, and the sons of Atreus, and the bold son of Tydeus; perchance some one well skilled in the ways of fate has advised to this, or it may be, their own courage urges them to the attack."

To her replied great Hector with the curiously-wrought helmet:—"In truth, my wife, all that thou hast said fills me too with care; but much do I fear what the Trojans will say, and the long-robed women of Troy, if like a coward I shun the battle. Nor will my heart let me do it, for I have been trained to be a brave warrior, and to fight in the first ranks, for the glory of my father, and for my own. Well do I know there will be a day when sacred Ilion must fall, and my father Priam, and the people of my warlike father. But I care not so much for the sorrows of the Trojans that are to come, nor for the fate of my mother Hecuba, nor my father Priam, nor for my brethren, many and brave though they be, who will fall in the dust before their enemies—as for *thee*, when some Achæan, clad in mail of brass, shall lead thee weeping into captivity to Argos, where thou must ply the loom at the bidding of a mistress, and carry water from the spring of Messe or Hypereia, an unwilling slave indeed, but the strong hand of necessity will be upon thee; and perchance some one will say as he sees thee drop a tear, 'This is the wife of Hector, the bravest of the horse-taming Trojans, when our people fought about Ilion.' Thus, perchance, some one will say, and this will be to thee a fresh sorrow, to feel the want of thy husband to ward off the day of servitude. But may the earth upheaved cover my body before I hear the wailings of thy captivity."

Thus spoke noble Hector, and stretched out his arms to his son; but the child with cries clung to the bosom of his well-zoned nurse, startled at the appearance of his father, scared at the brass, and the horse crest which nodded fearfully from the top of the helmet. The fond father and the chaste mother smiled. Straightway Hector took the helmet from his head and laid it all-glittering on the ground: he kissed his dear son, and fondled him in his arms, and then addressed a prayer to Jupiter and all the gods:—"O Jupiter, and ye gods, grant that this my son may be, like his father, a leader among the Trojans, brave in battle and a brave king of Ilion. And hereafter may the people say of him as he comes from battle, 'He is far braver than his father;' and may he bring back the bloody spoils having slain his enemy, and please his mother's heart."

Thus he said, and placed his child in the arms of his dear wife, who received him on her sweet bosom, smiling amidst her tears. Her husband saw and pitied; he gently touched his wife, and said, "Dear woman, grieve not, I pray, over much, for no enemy shall send me to the world below before the time of fate. And no man has ever escaped death, neither the coward nor the brave, when he has once come into the world. But go home, and attend to thy labours, to the loom and the distaff, and bid the slaves perform their tasks; war is the business of men, and mine most of all who live in Ilion."

Thus spake noble Hector, and took his helmet crowned with a horse's tail. His wife went homewards, but often looked back and dropped a large tear.

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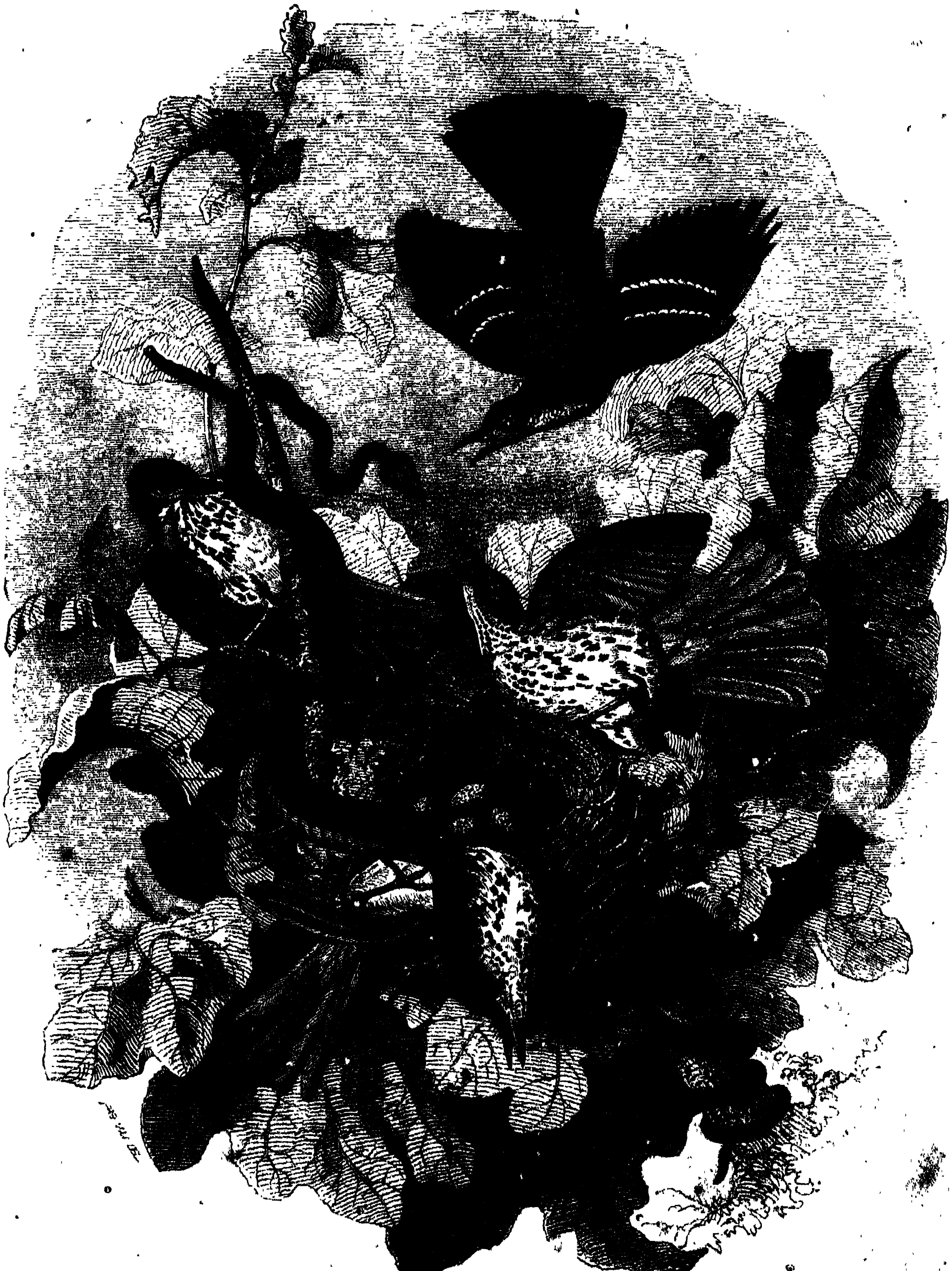
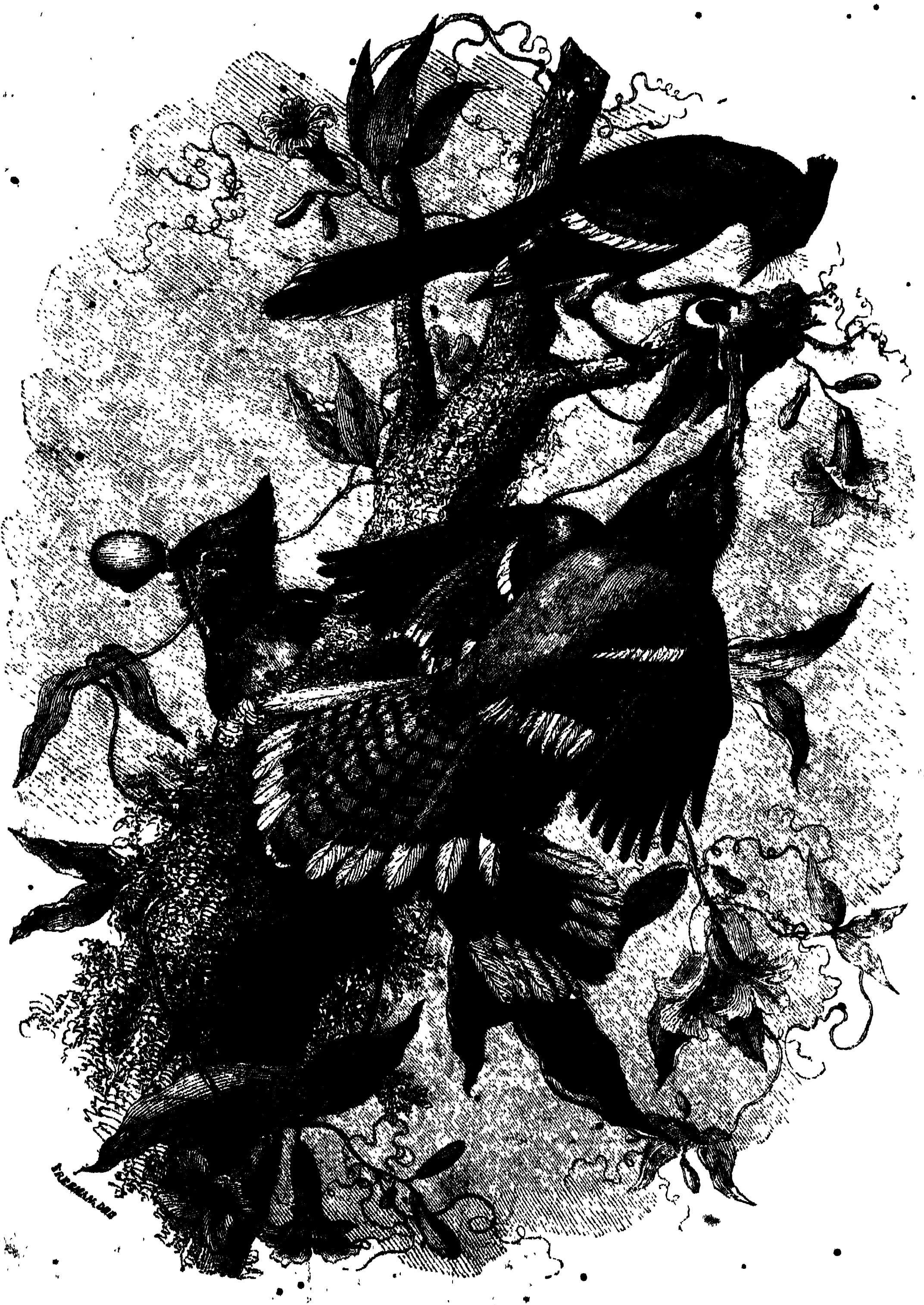
* Here a line is omitted, which is probably spurious.

WORKS OF AUDUBON.



THE RED-WINGED THRUSH (*Turdus Rufus*). FROM A DRAWING BY AUDUBON.

The red-winged thrush, or little mocking-bird of America, has a black attenuated beak, rather long, slightly curved, compressed, pointed, arched in the middle of the upper mandible, sharp at the edges; the lower mandible is of a clear blue colour at the base, and is almost straight; the nostrils are of an oblong shape, and half closed by a thin membrane. The general appearance of the bird is light and elegant. Its feet are brown, strong, and rather long, the tarsus compressed, and slender towards the upper part, as



THE BLUE JAY OF AMERICA. FROM A DRAWING BY AUDUBON.

also the fingers and the tibia; the claws are contracted, curved, and very sharp. Its plumage is soft and speckled. The first feather of the wings is rather short; the fourth and fifth rather longer. There are a dozen of them in the tail, long and wide-spreading at the ends. The iris is yellow. The general colour of the bird is a dark but still brilliant red. Across the wings there are streaks of white, edged with a sort of black fringe, presenting a very beautiful contrast. The under part of the body is of a brownish white colour, sprinkled with rich brown spots. The plumage of the tail has a reddish hue, but presents a lighter appearance than the other parts of the body. The female closely resembles the male. The wings of the former are somewhat smaller when extended, and the spots on the neck are less sombre, but these are the only perceptible differences.

The nest in our engraving is supposed to be built in the black oak, a species very common in Kentucky, the wood of which, however, is only used for firing, and the acorns for feeding hogs. The black serpent glides nimbly along the trunk of the tree, reaches the ground, and almost invariably escapes pursuit through the thickets of brushwood. It lives on birds, frogs, eggs, and the smaller quadrupeds, and evinces the greatest antipathy to all other species of serpents, which it fights fiercely upon the least provocation, although deprived of its fangs.

An attack made by one of these animals upon a red-winged thrush's nest has been faithfully and graphically sketched by Audubon, and is admirably reproduced in our engraving. The vain attempts of the old ones to defend their eggs and home against the destroyer are depicted in a touching and beautiful manner.

THE TROUBADOURS.

After the overthrow of the Roman empire in the West, the northern languages of the invaders became engrafted upon the *rustic Roman*, or provincial Latin, which everywhere prevailed throughout the western territories of the empire. It was not, however, until the tenth century that these rude dialects attained to sufficient consistency to form distinct and separate languages for each of the nations of southern Europe. This consolidation divided the written language of France into two great branches—the *langue d'Oi* and the *langue d'Oc*, or the Provençal; the Romance spoken north of the Loire, and the Romance which prevailed south of that river. Of all the new languages which were formed about this period, the latter of the two French idioms now mentioned was the first formed, and the most rapidly cultivated. Flexible, lively, and artificial, it became the vernacular of all southern Gaul, and of Catalonia and Arragon in Spain. Dryden, in the preface to his Fables, says that it was the most polished of all the modern languages, and that Chaucer availed himself of it to ornament and enrich our own. Contemporaneously with the development of the Provençal tongue, chivalry had its rise. The feudal system had already been in existence for three or four centuries, and for its harsh realities, this new "spirit of the age," whose essential character was devotion to women and to honour, largely substituted its own romantic and attractive social fictions. Feudal relations became modified, and a taste for elegance and the arts at length made its way over the Pyrenees, and took root in the south of France. In such a state of improved civilisation and softened manners shone out the spirit of poetry "over Provençe and all the south of Europe, like an electric flash in the midst of the most palpable darkness, illuminating all things by the brightness of its flame." The organs through which it spoke were the Troubadours.

"Appearing on the horizon as morning stars of a new civilisation, just as the thick mists of the dark ages of our era had rolled away from France, these poets stand forth as utterly unconnected with the past, and are, therefore, the first literary representatives of modern European society, as distinguished from the ancient societies of Greece and Rome." These sentences correctly point out the position which the "inventors" occupied in the literary history of Europe. Rising in an era which still retained many of the barbarous customs of the dark ages that had scarcely passed away, their reputation spread rapidly from the extremity of Spain to that of Italy, and they served as models to nearly all the poets who succeeded them. The comparatively few remains of their brilliant but superficial productions, which are now accessible, reveal to us the sentiments, the imagination, and the spirit of modern Europe in its infancy. Such being the influence which they exerted upon modern literature, and the relation in which they stood to it, a few brief notes about the most distinguished of these "poets of chivalry," of whom so little has been written in our own language, may not be without interest.

The troubadours were nearly all men of rank, who lived in their own domains, and cultivated poetry rather for its own sake than for the rewards which followed it. Some, however, were raised above their fellows by their rank in society, rather than by superiority of poetic talent. The earliest of these was William count of Poictiers and duke of Aquitaine. A circumstance in the life of this troubadour, who was born in the year 1071, will serve to show the prevalence of vice, no less than of wit, in his character. In open violation of all law, he had married the wife of the viscount of Chatteleraud. This adulterous connexion excited the displeasure of the bishop of Poictiers, who threatened him with excommunication unless it was broken up. William drew his sword and threatened to kill the prelate if he did not immediately absolve him; the bishop feigned himself alarmed, and desired a moment for reflection, but employed the short delay in finishing the threatened ceremony of expulsion from the church. "Strike now," said the prelate, "I am ready." "No," said the count, "I do not love you well enough to dismies your soul to paradise; but I will send your body into exile." He afterwards took part in the crusades, and on his return gave himself up to indulgence in sensual pleasures, and to poetic celebrations of love and war. Nine of these compositions have been preserved, and are remarkable for the elegance and harmony of their versification. He died in 1122. William of Poictiers was not the only prince who cultivated *el Gai Saber* (the gay science), as this class of poetry was then designated. Richard I., of England, was hardly more distinguished for his abilities as a warrior than for his poetic talents in treating of the details of the heart. Only two efforts of his muse, however, remain. One of these interesting relics formed his reply to the song of his minstrel Blondel, who thus discovered the place of his master's confinement. It runs thus:—

"No nymph my heart can wound,
If favour she divide
And smile on all around,
Unwilling to decide;
I'd rather hatred bear,
Than love with others share."

The other poetical effusion of Cœur de Lion was a song written during his confinement in the same prison, in which he laments the neglect and ingratitude of his former friends and followers. The first and last stanzas will be a sufficient sample of these royal lugubrations:—

"No wretched captive of his prison speaks,
Unless with pain and bitterness of soul,
Yet consolation from the muse he seeks,
Whose voice alone misfortune can control.
Where now is each ally, each baron, friend,
Whose face I ne'er beheld without a smile?
Will none, his sovereign to redeem, expend
The smallest portion of his treasures vile?

* * * * *

Know all ye men of Aquitaine and Touraine,
And every bach'lor knight, robust and brave,
That duty, now, and love, alike are vain,
From bonds your sovereign and your friend to save?
Remote from consolation, here I lie,
The wretched captive of a powerful foe,
Who all your zeal and ardour can defy,
Nor leaves you ought but pity to bestow."

With Richard of England may be compared Frederick of Sicily, as in both the poetic talent was the organ of politics, as well as of gallantry. A few scraps, however, are all that remain of his effusions, but these are sufficiently striking to show that he attained no mean eminence as a troubadour. Amongst the other distinguished professors of the gay science may be mentioned Bertrand de Born, lord of Hautefort, a restless, intriguing man, whom Dante has placed in his *Inferno*, for having encouraged the rebellion of the sons of Henry II. of England against their father. In his terrible fiction the Italian poet is represented as meeting Bertrand in hell; the troubadour advances towards him *carrying his head in his hand*; the lips open, and thus address the author of the "Divine Comedy!"—

——"Now behold
This grievous torment, thou, who breathing goest
To spy the dead: behold, if any else
Be terrible as this. And that on earth
Thou may'st hear tidings of me, know that I
Am Bertrand, he of Born, who gave king John
The counsel mischievous. Father and son
I set at mutual war. For Absalom
And David, more did not Ahitophel,
Spurring them on maliciously to strife.

> For parting those so closely knit, my brain
> Parted, alas! I carry, from its source,
> That in this trunk inhabits. Thus the law
> Of retribution fiercely works in me."

Much as he was devoted to war, however, this ardent knight was not insensible to the charms of love. He became passionately attached to the daughter of the Viscount de Turtemal; his love was reciprocated, but jealousy often ruffled the "smoothness" of its course. One of his extant pieces is a defence of himself against her suspicions of his fidelity. In one of these stanzas he thus pleads for a continuance of her favour:—

> "I cannot hide from thee, how much I fear
> The whispers breathed by flatterers in thine ear
> Against my faith. But turn not, oh! I pray,
> That heart so true, so faithful, so sincere,
> So humble, and so frank, to me so dear,
> Oh lady! turn it not from me away."

But more distinguished for poetic talent than any yet mentioned was Armand de Marveil. This troubadour was born at Marveil, in Perigord, in a humble rank of life, from which his talents fortunately raised him, and he became attached to the court of Roger viscount of Beziers. The divinity on whom his affections were bestowed, and whose charms were celebrated by his muse, was the Countess Adelaide, the wife of his master. The following lines well express the tenderness which pervades most of his compositions:—

> "All I behold recalls the memory
> Of her I love. The freshness of the hour,
> Th' enamell'd fields, the many coloured flowers,
> Speaking of her, move me to melody.
> Had not the poets, with their courtly phrase,
> Saluted many a fair of meaner worth,
> I could not now have rendered thee the praise
> So justly due, of 'fairest of the earth.'
> To name thee thus had been to speak thy name,
> And waken, o'er thy cheek, the blush of modest shame."

This "great master of love," as he has been named, died somewhere about the end of the twelfth century. "He has left many poems," says Sismondi, "some of which are very long. One of his pieces contains four hundred verses, and many of them two hundred. His language is clear and easy, and his text appears to have suffered but little alteration. He is, therefore, a troubadour whose works might be separately printed, to try the taste of the public for Provençal poetry, and at the same time to gratify the wishes of the learned throughout all Europe, who regret the loss of these monuments of our earliest literature and civilisation."

Next to De Marveil may be ranked Arnaud Daniel. This distinguished troubadour, whom Petrarch considered the greatest of all the Provençal poets, was born in the twelfth century, in the castle of Ribeyrac, in Perigord, of poor but noble parents. His success and reputation were largely owing to a new kind of composition, called the sestino, or six-lined stanza, of which he was the inventor. Its merit consisted in the difficulty of certain combinations of verses, repeated in a certain order. Most of his pieces are sonnets, which were addressed to the wife of William de Bourville, his "ladye-love." An anecdote remains on record, in connexion with a visit which he made to England, which illustrates rather the aptness of his memory than the readiness of his poetic talent. Being at court, he was challenged by a minstrel, in the presence of the king, to cope with him in the composition of a song. Daniel consented, and a wager was taken. The king gave them ten days to compose the piece, and five to learn it. At the end of the third day the minstrel announced that he was ready. But the troubadour, who occupied an adjoining chamber, had laboured in vain to compose a syllable. On the following evening, however, he overheard his rival practising his song; the same thing occurred on the next day; Daniel listened attentively, and at length made himself master both of the air and the words. On the day appointed they appeared before the king, when Daniel, who sang first, repeated the minstrel's song. The latter claimed the composition as his own, but the king declared it to be impossible. The troubadour at length owned the fraud, and the sovereign, pleased with the adventure, restored to each the money they had deposited, and loaded them both with presents. The date of this poet's death is unknown.

The few examples now given will be sufficient to convey an idea of the general character of these amatory productions. Love and war were their themes, and upon these their celebrators rung every possible variety of changes. They did not consist, however, merely of single and distinct poems by individual authors. There was one large class of them—called *Tensons*—in which two troubadours carried on a sort of poetic debate, in which love and logic were about equally prominent. One of the disputants opened the discussion by starting some point of amorous jurisprudence, which he defended in quaint verses, and with a truly laudable display of legal acumen: his opponent answered in the same style, and the poetic pleadings were continued as long as the respective advocates could find arguments and rhymes. The matter was then referred to a tribunal, called a *Cour d' Amour* (Court of Love). This, which was one of the most curious institutions connected with the profession of the troubadours, consisted for the most part of ladies eminent for rank and character, whose decisions in all matters of love and gallantry were absolute and final. One or two of the questions submitted to these tribunals, and of their judgments upon them, will sufficiently illustrate their character and functions:—

"*Question.* Is it between lovers, or between husband and wife, that the greatest affection, the liveliest attachment, exists?

"*Judgment.* The attachment existing between husband and wife, and the tender affection existing between lovers, are sentiments of a very different nature: a just comparison cannot be established between matters which bear no mutual relation to each other.

"*Question.* A troubadour having loved a young lady still in her childhood, as soon as she attained a more advanced age declared his love, and received from her a promise of a kiss when he should come to see her. Nevertheless, she subsequently refused to fulfil her promise, on pretence that when she made it she was not of an age to understand its consequences.

"*Judgment.* The troubadour shall be at liberty to take the kiss, but upon condition that he immediately restore it."

Many of these lady-judges were themselves able to reply to the poetic effusions composed in honour of their charms. Only a few of their compositions remain, but these are sufficient to show that their poetic talent was not inferior to that of the troubadours. "Poetry, at that time," says an acute critic, "aspired neither to creative energy, nor to sublimity of thought, nor to variety. Those powerful conceptions of genius which, at a later period, have given birth to the drama and the epic were yet unknown; and, in the expression of sentiment, a tenderer and more delicate inspiration naturally endowed the productions of these poetesses with a more lyrical character." The following stanzas, from one of the most beautiful of these songs, by Clara d'Andusa, are a favourable sample of these tender productions, whose chief merit was the exquisite harmony of their verse, which cannot, of course, be preserved in a translation:—

> "Into what cruel grief and deep distress
> The jealous and false have plunged my heart,
> Depriving it by every treacherous art
> Of all its hopes of joy and happiness:
> For they have forced thee from my arms to fly,
> Whom far above this evil life I prize;
> And they have hid thee from my loving eyes.
> Alas! with grief, and ire, and rage I die.
>
> "Yet they, who blame my passionate love to thee,
> Can never teach my heart a nobler flame,
> A sweeter hope, than that which thrills my frame,
> A love so full of joy and harmony.
> Nor is there one—no, not my deadliest foe,
> Whom speaking praise of thee, I do not love,
> Nor one, so dear to me, who would not move
> My wrath, if from his lips dispraise should flow.

* * * * *

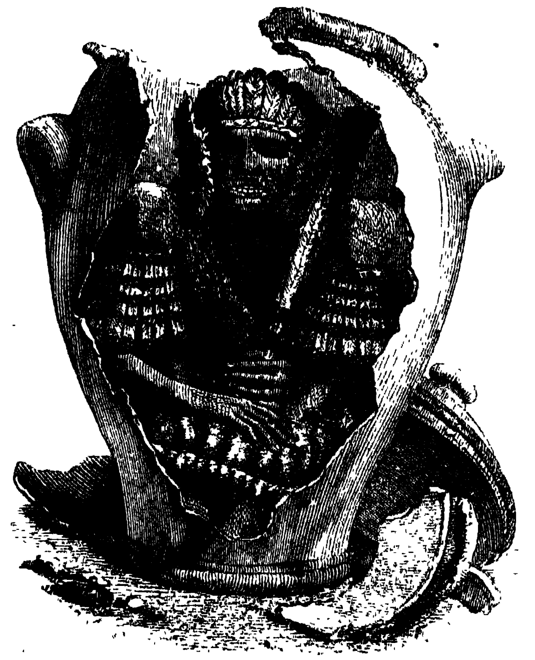
> "Love! so o'ermastering is my soul's distress,
> At not beholding thee, that when I sing,
> My notes are lost in tears and sorrowing,
> Nor can my verse my heart's death express."

But the reputation of these Provençal poets was destined to be ephemeral. It is true that the literature which they created enjoyed a brilliant existence of three centuries; but it contained within itself its own principle of decay, in the great ignorance of its authors, and in the impossibility of their giving to their poetry a higher character than was possessed by themselves. Their only models were the songs of the Spanish Arabs; with the elegant inventions of ancient classical literature they had no acquaintance; and of the inspiring influence of strong religious emotions they were equally ignorant. It is not to be wondered at, then, that such a paucity of resources produced not a single masterpiece, or a single work of genius destined to a literary immortality. After the thirteenth century the voice of the troubadours was silent; and their poetry, which had been the delight of every court, which had animated every festival, and infused chivalrous life into all classes of the people, became ranked amongst the productions of the dead languages. It was like a beautiful flower springing up in a barren soil. But the crusade waged by pope Innocent III. against the Albigenses, who had taken refuge in Provençe, hastened the extinction of the poetic race, whose decline had already begun. In a land thus devastated by horrors unparalleled in the history of religious persecution, the Muses refused their inspiration, and the voice of the troubadours was heard no more.

THE "TUB" OF DIOGENES.

The "Tub of Diogenes" is probably better known to our readers than any other of the domestic utensils of the ancients, notwithstanding all that has been done in excavating remains and collecting vases and other vessels in use amongst the Etruscans, Greeks, and Romans. Everyone has heard of the contempt of the philosopher himself for all the rest of mankind, and his stern repudiation of the use of most of the comforts as well as luxuries of life, and is aware that his snarling, doggish disposition at last procured him the appellation of the *Cynic*. Most people know, also, that he was in the habit of drinking water out of a shell, till he saw a boy drinking from the hollow of his hand, whereupon he instantly threw away the shell, and adopted the same course, angry with himself for having so long indulged in the use of a piece of unnecessary luxury, and that, when Alexander the Great, then in the height of his power, visited him, and asked him what favour he could bestow on him, that he sternly replied, "To stand out of my sunshine."

It is not, however, so much with the philosopher himself that we are about to concern ourselves, as with a little peculiarity of his, namely, his fancy for living in a tub; and coming down from generals to particulars, we beg to direct our readers' attention to the tub itself, and then to assert in the face of the unanimous testimony of the most renowned scholars of ancient and modern times, that Diogenes did *not* live in a "tub," but in a pot. A Flemish painter has represented Ulysses smoking a clay pipe, and it is just as ridiculous to put the illustrious cynic in a big washing tub. The popular notion takes its origin in an error of translators, who have rendered a word which really means a wine vessel, a tub. But tubs, or more properly speaking casks, were, as Pliny tells us, of Celtic or Gallic origin. The Greeks and Romans kept their wine in *amphoræ*, which are nothing else than great clay pots, often without a flat or standing bottom, and which were buried in the sand in their cellars. It was very natural, then, for Diogenes, when in search of a moveable cave, to choose a vessel of this description to serve as his place of abode, and it is stated, moreover, that he would by no means have anything but a cracked one, which of course could be of no use for any other purpose—a fact quite in keeping with the simplicity of the good man's character.

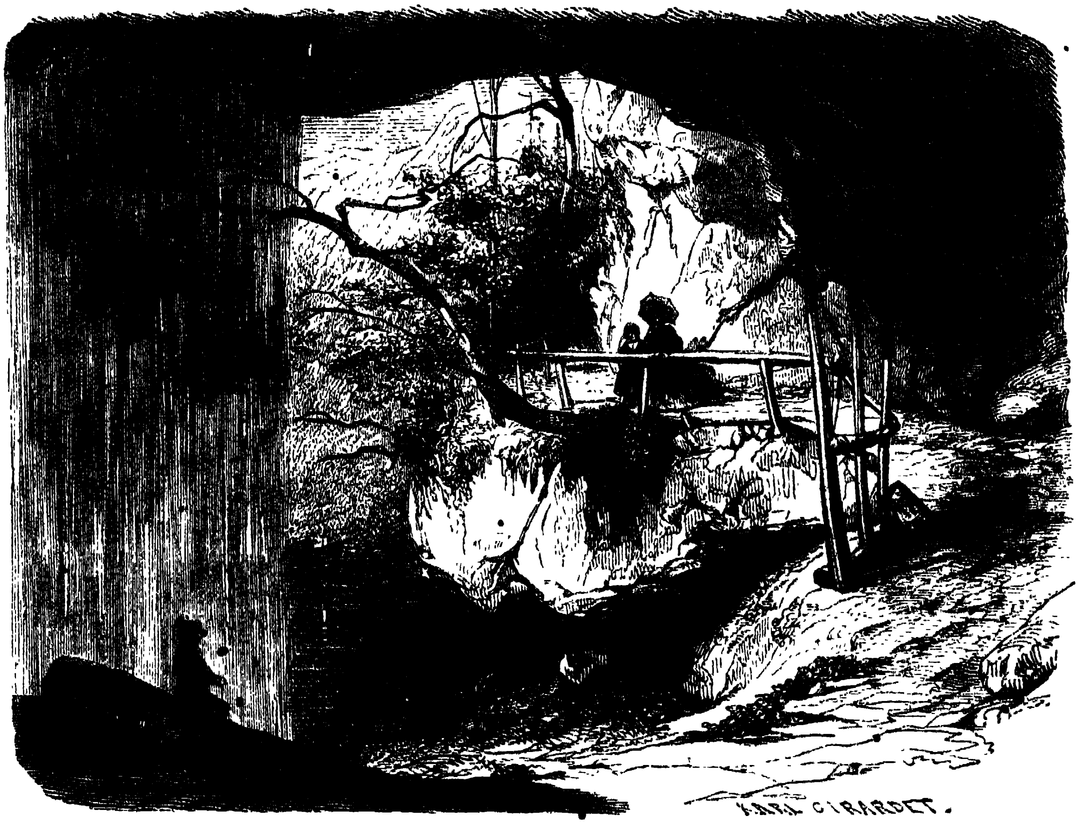


The sum of the whole then is, that Diogenes, being a "cynic," lived in a kennel, and that the kennel was a cracked pot. We give an engraving of him as he may be supposed to have appeared in his palmy days.

It would appear, however, that certain people in distant parts of the world, who doubtless never heard of the Greek philosopher, made a similar sort of utensil to that in which he fixed his habitation serve as a sepulchre for their dead. However commonplace, or even ridiculous this mode of sepulture may seem to us, it was doubtless adopted with the very natural desire to secure to the ashes of the departed a safe and durable retreat, in which they might be preserved from mingling with the common dust around. Some of these singular remains of an unknown state of society, containing the mummies of warriors or chiefs, doubtless famous men in their time, have been found at the foot of great trees in the primeval forests on the banks of the Paraiba, in Brazil, a territory now inhabited, or rather possessed, by the Corroados tribe of Indians. We give an engraving of one of them, as sketched by M. Debret, a French traveller.

SWITZERLAND IN SUMMER.

A FEW months ago we presented our readers with an engraving of the Cascade of Giessbach as it appears when frozen in winter. Our present sketch is taken from a different point of view, and at a different season of the year, and represents a scene of surpassing beauty. None of the Swiss waterfalls equals that of Giessbach. Reichenbach has a greater supply of water; Staubbach is higher; the fall of the Rhine more imposing; but in grace and picturesque beauty there is nothing like Giessbach. Standing in front of it, it seems to fall in the midst of verdure, for rock and sand are completely hidden under the moss and long sedge-grass. Underneath the rock over which the water rolls, trees and shrubs stretch out from beneath, and make it seem as if Giessbach fell from the sky across forest foliage, as it leaps out so as to leave a wide interval. Nothing can be more striking than the landscape in front as seen by the spectator in the rear, through the liquid, but transparent mass, which precipitates itself into the river below with a tremendous noise, whence it flows calmly on and loses itself in the lake of Brientz.


KARL GIRARDET.

CASCADE OF GIESSBACH IN THE BERNESE OBERLAND. DRAWN FROM NATURE BY KARL GIRARDET.

Wealthy foreigners sometimes illuminate the cascade, if we may so speak, by fixing torches in the brushwood between the rock and the water; and it is said that this forms a spectacle of surpassing magnificence. It is almost to be regretted, however, that the desire of producing a scene of transient brilliance should have induced any one to adopt means like this, as the smoke from the torches has blackened the rocks all around, and thus deprived them of the blue and yellowish tints which add so much to the beauty of mountain scenery. There is always sufficient grandeur in the landscape to impress the mind with the sublimest emotions without any artificial aids. To stand on the rocky pathway, on a fine night in summer, when the moon is high in the heavens, the lake sleeping in beauty, and not a sound abroad but the voice of the cataract, is to enjoy one of those exquisite pleasures which few but tourists ever know.

Between Faulhorn and the Wildgerst, nearly three thousand feet above the level of the sea, is a gloomy and narrow valley, stretching east and west, called the Valley des Perdrix de Neige. It is surrounded by lofty mountains, rising perpendicularly like huge walls, so that no ray of the sun ever penetrates it, and the snow never melts even during the hottest summers. It contains two lakes, the ice on which is thawed during two weeks only. Black, motionless, and gloomy, almost always covered with a crust of ice, they resemble the lakes of the infernal regions described by Dante. One is called the Lac des Sorcieres, the other the Lac de Grêle. These two are the sources of the Giessbach. One of its branches flows from the former under ground, the other from the latter above ground, and the two unite a little farther down to form the first cascade, that called the Ischingelfeld. It soon after receives several additions from smaller streams, and flows through a gorge of frightful depth, in issuing from which it rushes on with great rapidity, as if rejoicing in its deliverance. It soon grows calm, and meanders gently through the meadows and corn-fields of a shady valley; but on its arrival at the farther extremity it leaps from fall to fall until it reaches the Lake of Brientz, about 2,000 feet below. The Swiss have given to these cascades the names of some of their great patriots, who in evil days stood boldly forward for the right, and died in battle for their country and liberty. Too poor to raise marble columns or storied urns to perpetuate the memory of their benefactors, they have called upon the sublimest scenes of their native land to hand down to all coming generations the noble deeds of "the brave days of old,—"

> ———"Monumentum ære perennius
> Regalique situ pyramidum altius."

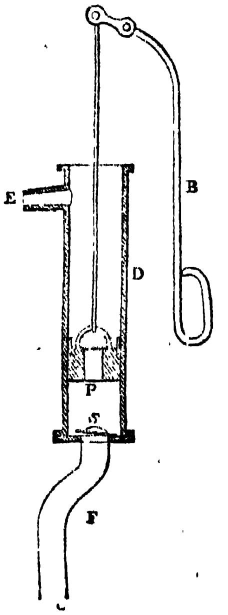
HYDRAULICS;

OR, THE RAISING OF WATER BY MACHINES.

WATER for domestic use, and the purposes of draining and irrigation, has been raised by machines from an early period; and numerous have been the inventions of this kind, from the ancient rope and bucket, down to the modern steam-engine. Some ingenious hydraulic machines were known even before the Christian era; among which may be reckoned the screw of Archimedes, the pump of Ctesebius, the tympanum of Vitruvius, and the Persian wheel. Animal power, the force of water, and the pressure of steam have all been employed as prime-movers of hydraulic machines. Leaving out of consideration at present the nature of the moving power, such machines may conveniently be divided into two classes: *first*, those in which atmospheric pressure, steam, or hydrodynamic impulse is employed; as pumps, hydraulic rams, &c. And, *secondly*, those in which buckets, float-boards, vanes, and similar apparatus are used, as Archimedes' screw, water-wheels, tympanums, norias, &c. Among the first class of machines, the most useful of which we propose now to describe, may be included the hydrostatic press of Bramah, its practical utility depending solely on the application of the forcing pump.

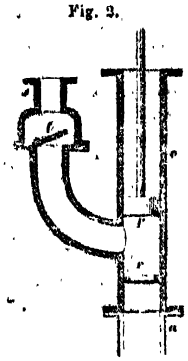
The common suction-pump, of which the invention is attributed to Ctesebius falls to be first described. It is represented in fig. 1, where F is the suction-tube, communicating at its lower end with the well or pond from which the water is to be raised; and, at its upper end with the body of the pump D, which is a truly bored cylinder. The piston P, which moves in the body of the pump is furnished in the middle with a valve opening upwards, and a similar valve, S, is placed at the upper extremity of the suction-tube F. When the piston P is raised from the bottom of the cylinder D by the handle or lever B, the valve S opens, the air contained in the suction-tube F, passes through it into the body of the pump, and is there rarefied When the piston is lowered, the valve S is shut, and the air compressed between this valve and the piston opens the valve in it, and escapes by the aperture E. In this manner every successive stroke of the piston rarifies the air in the suction-tube until a sufficient vacuum is formed, when the water in the well or pond will rise in this tube by the pressure of the atmosphere or external air on its surface; and if the tube be not more than thirty feet in length from that surface to the valve S, the water will force its way through this valve into the body of the pump. When this valve is again shut by the descent of the piston to the bottom of the cylinder, the water, unable to return through the valve S into the suction-tube, will be forced through the piston-valve into the upper part of the cylinder above the piston, and by the ascent of the latter, through the discharge-pipe E, into the reservoir or vessel appointed to receive it.

Fig. 1.



Having explained the nature of the common pump, erroneously called *suction-pump*—seeing that the *suction* of the water, or its ascent in following the piston, is due simply to the pressure of the atmosphere, and that it would fail in so doing, as soon as the column of water exceeded that pressure, the limit being at the utmost within thirty-four feet—we proceed to describe the operation of the *forcing pump*, represented in fig. 2: *a* is the suction-tube, having its lower end immersed in the water as before. *p* is a solid piston without a valve, which moves in the body of the pump *c*, by means of a lever as in the common pump. The air is withdrawn from the suction-tube as before; but instead of escaping through a valve in the piston, as it cannot return through the valve *r*, it is forced by the descent of the piston *p* up through the valve *l*, into the ascension tube *s*, the water then follows by the pressure of the atmosphere and the ascent of the piston, and is forced through the valve *r*: this valve is then closed by the descent of the piston, and the water in the body of the pump is forced through the valve *l*, and up the ascension-tube *s*, from which it cannot return, as its weight shuts the valve *l*. This process is continued until the water in the ascension-tube is raised to the required height, the force necessary to raise it by pressure on the piston continually increasing until it reaches that height, and is discharged from the ascension-tube.

Fig. 2.



In practice, the following rules are observed in the construction of pumps. The velocity of the piston is calculated to vary from six to nine inches per second. The area of the aperture covered by the valves is about half that of the body of the pump. The diameter of the suction-tube, and of the ascension or discharge-tube, is about two-thirds of that of the body of the pump. The stroke of the piston in large pumps, varies from three and a half to five feet. In good pumps, the loss occasioned by the time required for shutting the valves reduces the effect to about four-fifths of that produced by the piston. The following figures present different models of pistons and valves employed in the construction of pumps. Fig. 3, a piston packed with leather; fig. 4, a piston packed with hemp; fig. 5, a piston furnished with a single clack-valve; fig. 6, a piston with a double-clack or butterfly valve; fig. 7, interior of the body of a pump, in the bottom of which a single clack-valve works; fig. 8, separate view of a single clack-valve; fig. 9, a conical valve.

Fig. 3.

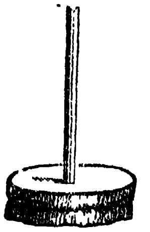


Fig. 4.

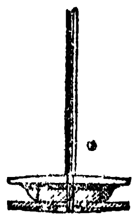


Fig. 5.

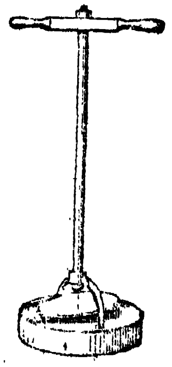


Fig. 6.

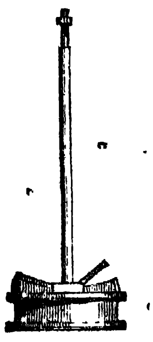


Fig. 7.

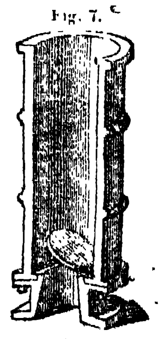


Fig. 8.

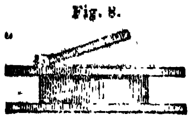
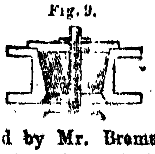


Fig. 9.



The hydrostatic or hydraulic press invented by Mr. Bramah, and patented in 1796, is a beautiful application of a principle previously known for nearly two centuries, and commonly called the hydrostatic paradox; viz. that any quantity of water, however small, may be made to balance any quantity however great. The practical effect of this principle is, that when water enclosed in a vessel quite full of the liquid, is pressed by a piston at any aperture with a given force, this pressure is at once communicated to every part of the vessel of the same size as the aperture, with the same force. Mr. Bramah, by an ingenious application of the forcing-pump to an apparatus constructed on this principle, produced one of the most powerful and useful machines used in the present day. It is represented in fig. 10, where *s* is the piston which moves in the cylindrical tube *f*, or small body of the pump; *p* is the piston which moves in the cylinder *o o'* or large body of the pump; and *a t b u* is the tube of communication between the two bodies of the pump. A lever of the second kind *l* raises the piston *s*, and the water in the reservoir *b'* is drawn into the body of the pump *f*. When the lever is pressed downward, a valve shuts, and prevents the water from returning into the reservoir *b'*, and forces it along the tube *t b u*, in order to act upon the lower extremity of the piston *p*, to which is attached the plate *p'*; *s f* is another plate, against which the objects to be compressed by the machine are pushed by the former. In consequence of the *quaquaversal* pressure of the water forced into the large body of the pump from the small one, the pressure of one pound on every square inch of the surface of the liquid in the latter will be communicated to every square inch of the surface of the liquid in the former. Hence, if the diameter of the piston *s* be one inch, and that of the piston *p* be ten inches, the pressure of one pound on the former will be 100 lbs. on the latter. A noble specimen of this press was exhibited in the Crystal Palace by the Bank Quay Foundry Company, Warrington; viz., that which was used for raising the Britannia Tubular Bridge. The greatest weight lifted by this press was 1,144 tons, and the quantity of water used for every lift of six feet, was 81½ gallons. The internal diameter of the great cylinder was twenty-two inches, and that of the ram or piston twenty inches.

Fig. 10.

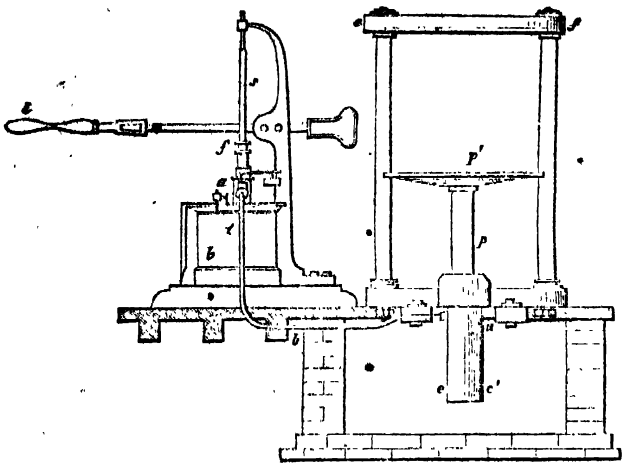
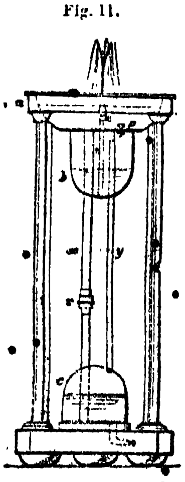


Fig. 11.



A variety of hydraulic machines have in modern times been constructed on the principle of *Hero's fountain*; such as the Hungarian machine employed for raising water from the mines of Schemnitz, the machine of Detrouville, the mechanism of Girard's lamps, &c. It is represented in fig. 11, and is composed of three vessels; an upper vessel *a*; a middle vessel *b*; and a lower vessel *c*. These vessels are connected by three tubes: the first *x*, descends from the bottom of the upper vessel, nearly to the bottom of the lower vessel; the second *y*, rises from the top of the lower vessel nearly to the top of the middle vessel; and the third *z*, rises nearly from the bottom of the middle vessel, and terminates in a jet a little above the upper vessel. The operation is as follows: water is put into the vessel *b*, by means of the cock *s*, it is then closed; water is also put into the vessel *a*; the cock *r*, in the tube *x* is then opened, and the water rushes from the upper vessel into the lower one; in this vessel the water is immediately acted on by the compression of the air which it contains, and is forced up the tube *y* into the vessel *b*; here the water is again acted on by the compression of the air which this vessel contains, and is forced up the tube *z*, through the jet, into the atmosphere, rising to a height above the upper vessel, which, theoretically speaking, is as much above the level of the water in the middle vessel as the level of the water in the upper vessel is above the level of the water in the lower vessel. The reason is that the air which is contained in the lower vessel, and in the middle one, supports a pressure determined by a height of water equal to the difference between the two levels of the water in the upper and lower vessels; the water contained in the middle vessel must therefore rise in the tube *z*, to the height due to this pressure.

The hydraulic ram, invented by Montgolfier in 1797, is a self-acting machine for raising moderate quantities of water. It is composed of an air-vessel and three valves, two for the water, and one for keeping up the supply of air. Its construction is founded on the principle that, if two vertical tubes communicate by a horizontal one, water falling from a certain height in the first vertical tube, and shutting instantaneously a valve placed near the extremity of the horizontal tube, will be suddenly stopt in the latter, and will rise in the second vertical tube to a higher level than that which it occupied in the former. Thus, t t', fig. 12, is the horizontal tube in which the water, descending from the reservoir, acts with a velocity depending on the height of the fall. This water tends to flow through the orifice *v*, which opens a communication with the natural level *n*, below the fall. But its momentum acquired from the fall shuts the valve *s*, and the water, unable to escape through *v*, runs through the tube *z*, rises in *u*, opens the valve *c*, and runs through the air-vessel *h h'* into the vertical tube *d c k* to a higher level than its original source. When the valve *c* is closed as well as the valve *s*, the water from the reservoir communicates with the lower level *n*. But the force of the falling water soon raises again the valve *s*, and the motion of ascent through the air-vessel recommences. In this vessel, the air acts like a spring on the surface of the water, and keeps up a continued flow of water in the ascending tube. The air-vessel is furnished with a snifting-valve, *p*, for the admission of air when required.

Fig. 12.

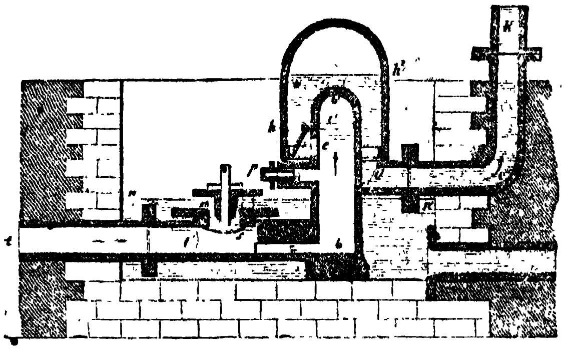
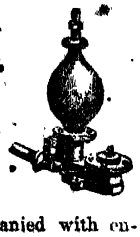


Fig 13.

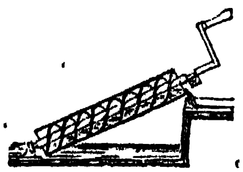


The form of the hydraulic ram may be varied, according to the situation in which it is to be placed. Several specimens of this machine were to be seen in the Great Exhibition. Fig. 13 is a representation of that exhibited by Mr. Freeman Roe, of the Strand.

Under the first class of hydraulic machines, of which the most important have now been described, might be classed the steam-engine invented by Captain Savery at the close of the seventeenth century; but we refer our readers for a full description of this machine, accompanied with engravings, to the History of the Steam-Engine, just published as the 22nd volume of the series entitled, "John Cassell's Library."

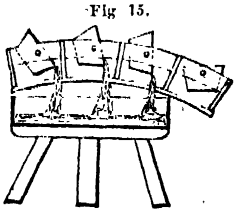
In the second class of hydraulic machines, one of the most ancient is the *screw of Archimedes*, represented in fig. 14. It was used for raising water and draining land in Egypt about two centuries before the Christian era. It consists of a hollow or tubular screw, formed round a cylinder, which revolves on a spindle inclined at an angle of about 45 degrees to the horizon. The extremities of he spindle rest on pivots, and the whole is made to revolve by means of a winch. The lower end of the tube being immersed in water, this liquid will flow to its level within the tube, and occupy the lowest bend. When the cylinder turns round, so as to raise the lower end of the tube, the water which has entered it will descend by its weight, and flow into the next bend. The lower end of the tube will then take up a second charge of water, like the first, which will be carried into the second bend by the revolution, while that in the second will be transferred to the third, and so on, till the water successively reaches the higher end of the tube, and is discharged into the upper reservoir.

Fig. 14.



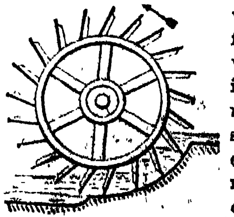
The *Persian wheel*, represented in fig. 15, and described by Vitruvius, consists merely of a ring or circular frame of wood, supported by arms or spokes from a central axle or gudgeon, on which it revolves vertically. On its circumference are hung a number of buckets, by iron loops, on round iron bolts, so that their heaviest parts may be below, and that they may constantly hang vertically as the wheel revolves. These buckets are successively carried, by this revolution, below the level of the water to be raised. They are thus filled, and are carried in turn to the highest point in the wheel, where they all come in contact with the side of a cistern or reservoir, by which they are tilted and emptied into it. They then descend empty, and are filled again successively, to be emptied as before.

Fig 15.



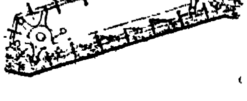
A *flash-wheel*, or a wheel furnished with vanes or float-boards projecting from its circumference, and revolving vertically, in a mill-course, is employed in cases where water is required to be raised but a small height. It is represented in fig. 16, where the arrow indicates the direction of the motion. This mode of raising water has the great inconvenience of acting by impulse—a disadvantageous mode of employing power.

Fig. 16.



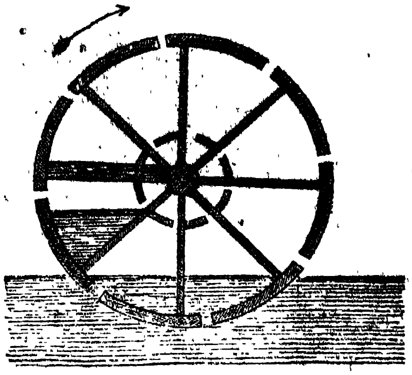
A machine like an inclined chain-pump, without the cylinder, and having float-boards instead of pistons, is sometimes used in the same manner as the preceding machine, and for the same purpose. It is represented in fig. 17, and is called, on the continent, *chapelet incliné*, or *slanting paternoster-work*. It is liable to the same objection as the flash-wheel, with the addition of the great friction arising from the axles and drums round which the float-boards revolve

Fig. 17.



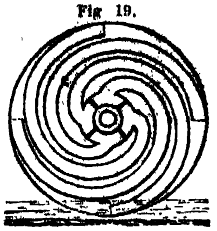
Of all the ancient machines for raising water, it appears that though the screw of Archimedes was the most curious, the *tympanum of Vitruvius* was the most effective; it is represented in section in figure 18. This machine consisted of a large hollow wheel, or drum, made of several planks joined together, and turning on a horizontal axle. The interior is divided into eight equal spaces by partitions radiating from the axle; each space or cell has an orifice of about half a foot in the rim of the drum, so formed as to give ready admission to the water; there are also eight hollow channels running parallel to the axle of the wheel, each corresponding to one of the large cells. As the wheel revolves, the water raised in these cells runs into the channels, and escapes through orifices into a reservoir placed under the axle. Thus, the water is raised through a height equal to the radius of the wheel. The chief defect of this machine arises from the water acting at a mechanical disadvantage in its rise through the effective quadrant.

Fig. 18.



The tympanum of M. de Lafaye, was invented by him in 1717, to remedy the defect of the preceding machine. It is represented in fig. 19, and constructed on the following principle. Having an axle whose circumference a little exceeds the height to which the water is to be raised, let a thread wrapped round it be gradually unwound, and the form of the curve described by its extremity be carefully traced; this curve is called the *involute* of the circle from which it unwound. Make a curved canal of the exact form of this involute; then, if the further extremity of this canal be fixed in the circumference of the tympanum, and the other extremity made to abut upon the axle, the water, in the course of its rotation, will rise in a vertical direction, tangential to the axle, and perpendicular to the canal, in all possible positions. Thus the weight, acting, as it were, always at the extremity of a horizontal radius, will be the same as if it acted upon the invariable arm of a lever, and the power which raises the weight will be always the same; and if the radius of the wheel, to which this hollow canal serves as a bent spoke, be equal to the height to which the water is to be raised, and consequently equal to the circumference of the axle, the power will be to the load of water as 1 to 6·2832. The inventor proposed four of these canals in his tympanum, though it has often been constructed with eight. By this construction, the weight to be raised always offers the same resistance, and that the least possible, while the power is applied in the most advantageous manner. In practice, this machine is decidedly superior to Archimedes' screw, or to the old tympanum machines, to which it bears a strong analogy.

Fig 19.



The species of chain-pump called *noria*, consists of a cord or endless chain, which revolves round two pulleys or drums placed vertically above each other, and to which buckets are attached. The lower pulley is sometimes fixed as represented in fig. 20; sometimes it is only supported by the cord, and loaded with a weight sufficient to keep it stretched; and sometimes this pulley is suppressed as represented in fig. 21. The utility of the noria depends chiefly on the construction of the buckets, the chain, and the wheels which support it. It depends also on the manner of emptying the buckets. The common chain-pump, called by the French, *chapelet vertical*, differs from the *noria* in this, that the buckets are replaced by pistons fixed to the endless chain, and by a fixed vertical tube in which the chain moves in its ascent.

Fig. 20.

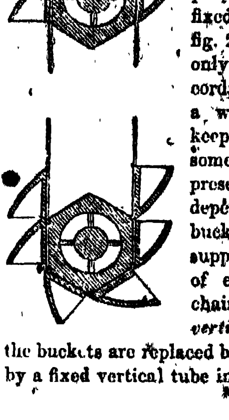
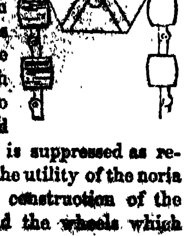
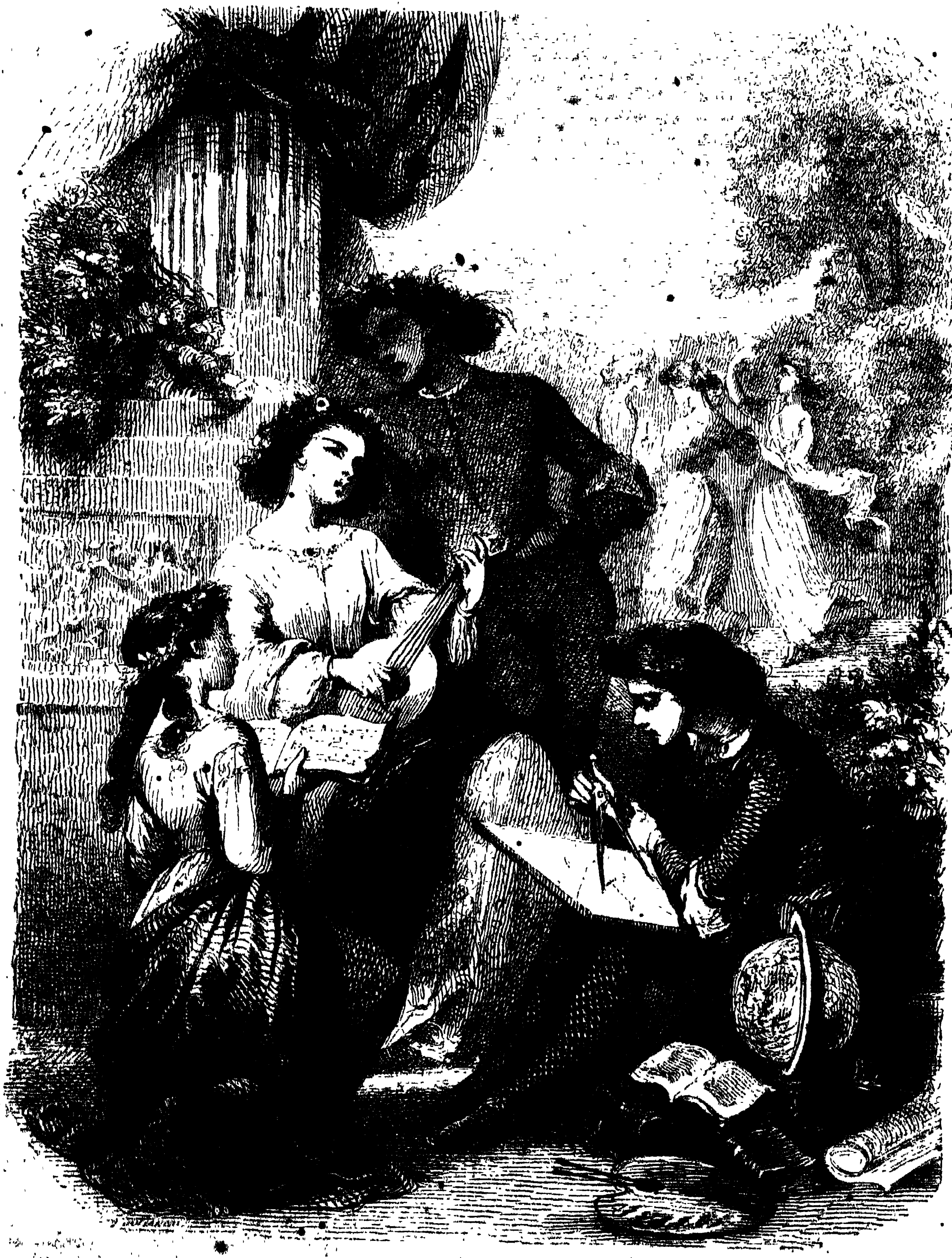


Fig. 21.



THE FOUR AGES; FROM DESIGNS BY T. JOHANNOT.



II.—YOUTH.

The word youth, by itself, speaks volumes. It does not need the illustrations of a cunning hand to explain it to any one of us, though it may afford pleasure to see well-remembered scenes or long lost joys brought again vividly before us by the aid of the artist's pencil. It comes alike to all, the best period of men's lives, and yet too often the worst spent, and most foolish. The helplessness and imbecility of infancy has passed, and an unknown world, and golden dreams, burst upon us. To the child, life was still a mystery. Like the first appearance of a dissolving view, only the vague outlines were seen dimly, and without distinctness, and his weak reason needed guidance and direction. But now the full tableau lies before him in its glory. He has climbed the mount, and before him is the promised land, and his eager spirit bids him enter in and take possession. It is in youth that most courage and self-confidence is to be found, because it has all the fire and vigour of manhood without the experience of age. It is experience which damps the ardour of men who have arrived at mature years. Time is the great trier of strength and calculator of chances. One defeat prevents a thousand failures afterwards, and teaches salutary lessons in the economizing of strength and resources.

The Greeks made youth a smiling, graceful, rosy-cheeked maiden, Hebe, the cup-bearer of the gods. In Rome she was called "Juventus;" but the form in which she was worshipped by the people was the same, and the adoration paid her was equally sincere and devout. In the graceful spirit which animated the mythology of Greece, each deity was but the embodiment of a principle, and the web of fiction woven around it, was often but a commentary on a great truth. The cheerfulness and hopefulness of the young gave Hebe the fabled power of bestowing on her votaries unfading charms of mind and body. The elasticity of spirit which diffuses happiness on all around, made her the dispenser of the nectar of the immortal gods. And she was crowned with the rose, the flower of loves, "*tó rodon tó tōn erōtōn,*" because in the summer of life, pleasure is not long sought alone, but the heart feels a craving for some one to love, some one to sympathise with, which dies out long before we reach the goal of our earthly race. A modern poet, who, though he pours forth his melodies in a foreign language, has touched many a chord to which English hearts can fully respond, won his bride by his fine embodiment of that vague but pure and beautiful sentimentality which all men experience in their youth. Lamartine was wandering alone one evening in July, when he heard a fine female voice singing with a foreign accent one of his own verses—

"Peut-être l'avenir me gardait-il encore,
Un retour de bonheur, dont l'espoir est perdu
Peut-être dans la foule une âme que j'ignore
Aurait compris mon âme, et m'aurait repondu."

The soul of the poet was the one of which the fair *chanteuse* was singing. He had found a second Elvira in a rich and beautiful English lady. He introduced himself, and as lovers had seldom met under happier auspices, we need hardly say they were married.

No wonder, then, that Hebe was crowned with roses, and that the Muses never sang so sweetly as when they traced the progress of true love through its rough and often tortuous course.

Youth and Love were always present together to the mind of the ancient artist, and to them he never failed to add Beauty. In later times we have not forgotten his lessons, though we cannot now understand, or rather, *feel*, their mythology as the ancients felt it, a great, but symmetrical allegory, pregnant with sublime meaning, though often overloaded with phantasies and mysticism. We have, therefore, in many instances cast aside the forms in which they embodied abstract conceptions, and copied from real life. Youth and beauty, and all their attendant pleasures and delights, stand before us as young men and maidens singing in the shade or dancing on the green. Music, and poetry of words and of motion, are there to lend grace and enchantment to the scene, and Knowledge too is opening her stores, and tempting the aspirant to cherish up hopes of future fame, which, alas, are so often destined to die long ere the summer is past. The artist has caught the spirit of the old poets, and has well depicted that intoxication of love and pleasure which, while it lasts, may truly be called delirium. It was not, however, difficult to do so, for the scene before us is just such as has been occurring ever since the world began, and shall be till its close—

"That part of paradise which man
Without the portal knows."

But in calmer moments, life assumes before the vision of youth a more sombre aspect, becomes real and earnest, is divested of the flowery meads with which in the first moments of rapture it seemed surrounded, and becomes, with startling rapidity, a march, a bivouac, a battle-field, a voyage, or a steep and rugged ascent, crowded with anxious faces, mortals struggling for subsistence, and wealth, and fame, or honours, and grown selfish and hardened by contact with one another. Here is no dreaming, no inactivity, no castle building.

"Love and hope and beauty's bloom,"

are not seen in the broad highway amongst the busy crowd. They who seek them must turn aside to quiet nooks and shady groves, and even there must not linger long, lest they be left far behind in the race.

In youth then we are still on the 'vantage ground. There is still time to pause and think, to look down calmly on the surging masses below, to mark the thousand crimes and follies that lure men to their doom, to select the course that leads to lasting fame, to choose a partner to cheer and support in the toils and disappointments of the journey, and soothe the pangs of bidding an eternal farewell to the "happy fields and pleasing shades" so truly "beloved in vain." Once entered upon that boisterous struggle, there is no return. To bear us through it well, there needs but faith, and hope, and charity; faith in God and in our fellow men, and hope beyond the grave—a mind stored with the lore of ages, and disciplined to arrange and preserve all it gathers; the high principle that scorns seeming, and the acuteness to detect, and the courage to expose humbug. Some men have achieved wonders ere the race was well begun. Pitt was the leader of the mightiest and most eloquent assemblage in the world at twenty-three, and Chatterton had achieved a lasting reputation in the most difficult walk of literature while yet a boy. Instances like these might, of course, be multiplied in sufficient numbers to fill a page—but for what good? Men are not born to be as good or better than others, but to be as good as they can *absolutely*. Comparisons are useful to shame the wicked into virtue, or the lazy into work, and examples are often opportunely cited to cheer the drooping courage of the struggling. All men, happily for mankind, cannot either be Pitts or Chattertons, but every one's conscience tells him truly whether he is fulfilling to the best of his ability the part assigned him by his Maker. Youth is above all things the season of preparation. Upon the way in which we employ it depends our after success or failure, whether we do nothing well, and live a life of galling mediocrity, or climb to the top of the ladder. Let us beware of the poetry and flowers, love and the music and the dance, and not drink *too* deeply of the enchanted fountain. They are all good and useful at proper times, and in proper places, but

"Not enjoyment and not sorrow
Is our destined end or way;
But to act that each to morrow
Find us farther than to-day!"

It is not the part of the artist to depict things as they ought to be, but as they are. His mission is to take care of the beautiful, for the useful takes care of itself. He does not therefore moralise with the pencil, as we do with the pen. He furnishes forms that are radiant with purity, beauty, and truth; it is for others to reflect upon them. There are "tongues in trees; books in running brooks; sermons in stones, and good in everything." While we admire we may learn; and whilst we turn fondly towards the scenes from youth, we may, after a moment's pause, gaze forward more hopefully to the future. Let us not look mournfully into the past; it comes not back again. The thread of our lives has not yet been spun out. The three grim sisters may still pursue their plodding task, and stay the stroke a little longer that bids hope and care alike be still. A mightier Being than they has the future in his keeping; to us he has committed the present, to do with it as we please. The past may be lovely to look upon, like the receding shore of his native land to the departing exile; and the future may be pleasant to dream of, like the Eldorado to which he is hastening: but it is the present only that we can use and enjoy. And while we are wise, let us also be merry. Cheerfulness should be our normal state; we should be ever more disposed to laugh than weep, and endeavour to keep intact for ever the youth of the soul. *L'âme ne peut vieillir.* Empires may pass away, and generation after generation sink to dust, but our inner being should not partake of the decay and infirmities of our mortal body. It is a part of Him in whose sight a thousand years are but as yesterday when it is past, and as a watch in the night.

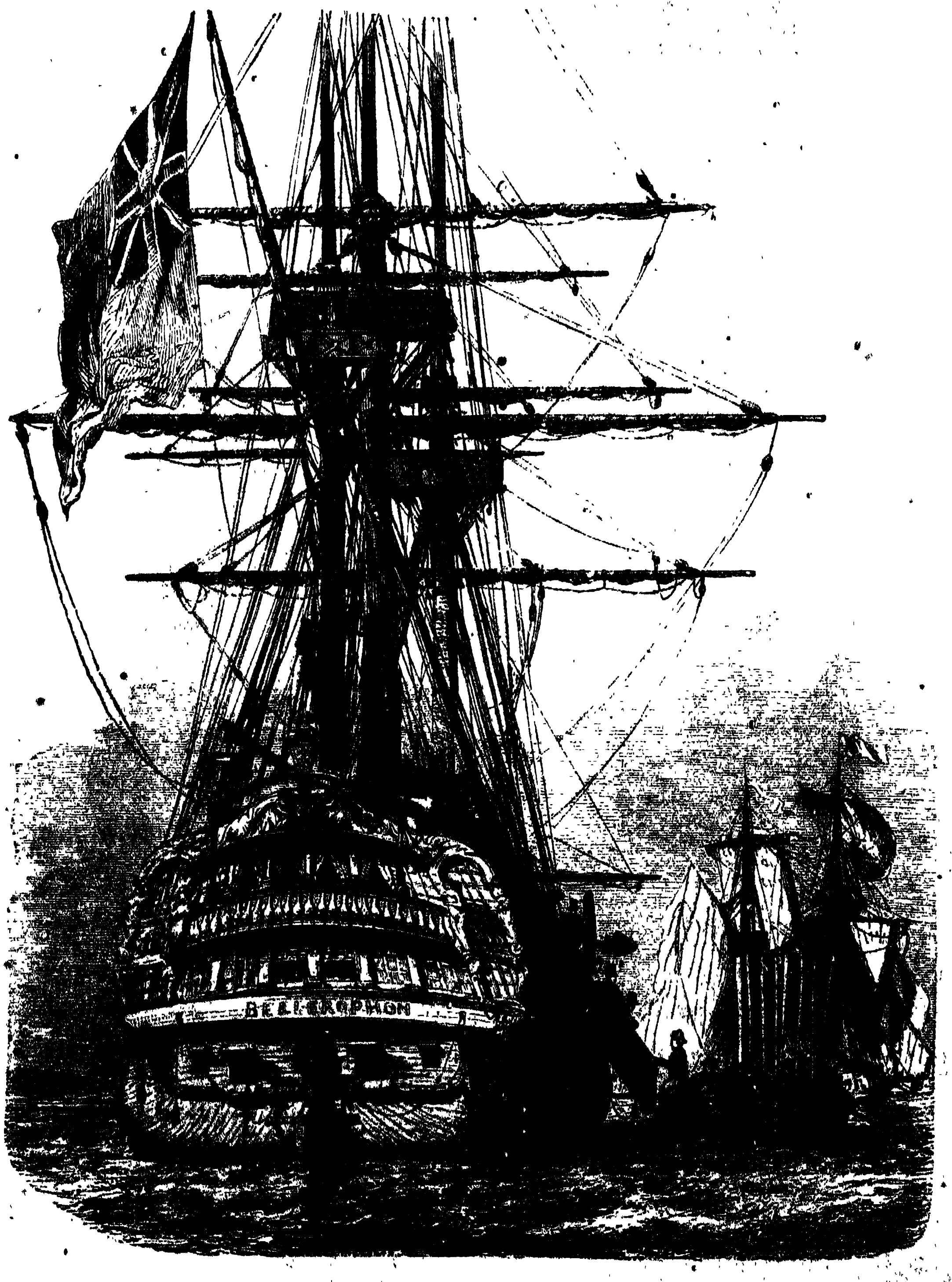
BUONAPARTE GOING ON BOARD THE BELLEROPHON.

WITH the incident illustrated in our engraving, may be said to have opened the last scene in the most remarkable drama which has ever occurred in the history of the world. Finding it impossible to re-organise an effective army after the defeat at Waterloo, Napoleon summoned the Council of State on the morning after his arrival in Paris, to advise upon the necessary measures, and found that the general voice recommended his abdication. He said little, and dissolved the council without announcing his decision. His own words afterwards to Las Casas, at St. Helena, furnish the best exposition of his feelings during the night which followed: "In that night of anguish and uncertainty I had to choose between two great courses; the one was to endeavour to save France by violence, and the other was to yield to the general impulse. Friends and enemies, the good and evil disposed, all were against me, and I stood alone. I was on the point of declaring myself permanently at the Tuileries, with my ministers and councillors of state. I had thoughts of rallying round me the six thousand guards who were in Paris, augmenting them with the best disposed portion of the national guard, who were very numerous, and the federate troops of the faubourgs,—of adjourning the chambers of legislature to Tours or Blois,—re-organising before the walls of Paris the wrecks of the army, and thus exerting my efforts singly, as a dictator, for the welfare of the country. * * * I hesitated long,—I weighed every argument on both sides; and I at length concluded that I could not make head against the coalition without and the royalists within. Abdication, therefore, was the only step I could adopt." Accordingly, on the following morning, the 22nd of June, 1815, this decision was communicated to the chambers, and on the third day after Napoleon left Paris for Malmaison. The rapid advance of the allied armies now compelled him to hasten the arrangements for his contemplated escape to America; and for this purpose he set out for Rochefort, where two frigates had been placed at his disposal by the provisional government. In the meantime, however, the news of his abdication had reached London, and the whole western coast of France was immediately blockaded by English cruisers to prevent his escape. The harbour and roadstead of Rochefort were watched by the "Bellerophon," a seventy-four, commanded by Captain Maitland, who had received orders to look out for and intercept the ex-emperor, and, in case of success, take him to England with all possible expedition. Louis XVIII. had re-entered Paris on the 8th, and the necessity of escape became every day more pressing. Accordingly on the 10th of July, Savary and Las Casas, two of his former officers, who had committed themselves to the fallen fortunes of their sovereign, were despatched to Captain Maitland, under a flag of truce, to inquire whether he had any knowledge of the passports which the emperor expected to receive from the British government, or whether it was its intention to throw any impediment in the way of his voyage to the United States. Captain Maitland replied that he had no knowledge of the passports, and that he could not permit any ship of war to leave the port of Rochefort, nor could he suffer any neutral vessel, as they had proposed, to pass with a personage of such importance. The succeeding days were passed by Napoleon in the consideration of various plans of escape. After duly weighing them all, none was found practicable, and a negotiation was again opened with the commander of the "Bellerophon," with a view to his going to England and seeking an asylum there. Captain Maitland was not free from ambiguity: "If he chooses to come on board the ship I command, I think, under the orders I am acting with, I may venture to receive him, and carry him to England." Napoleon now finally made up his mind to place himself on board the British ship, and accordingly prepared for carrying this intention into effect on the following morning. At the same time he despatched Gourgaud with a letter to the Prince Regent, in which he said, "I come, like Themistocles, to throw myself upon the hospitality of the British people. I put myself under the protection of their laws, which I claim from your royal highness, as the most powerful, the most constant, and the most generous of my enemies." The manner in which this appeal was answered is but too well known, and forms one of the darkest stains upon our nation's glory.

At daybreak, on the 15th July, 1815, Napoleon embarked on board the French brig Epervier (which is seen to the right of the "Bellerophon"), accompanied by his suite. When Captain Maitland saw the brig approach, he sent his barge to meet it, and bring the emperor on board. On its return, General Bertrand first ascended the ship's side, and was followed by Napoleon, whom the illustration shows stepping from the barge to the gangway. When he reached the quarter-deck, he pulled off his hat and said to the commander, "I am come to throw myself on the protection of your prince and laws." The captain then led him into the cabin, which was given up to his use, and afterwards, at his own request, presented all the officers to him, and he went round every part of the ship during the morning. About noon, on the following day, the "Bellerophon" got under weigh, and made sail for England. The voyage was tedious, and Napoleon spent much of his time in reading. On the 23rd July, the ship passed Ushant; the emperor cast many a melancholy look at the coast of France, but said nothing. At daybreak, on the 24th, they were off Dartmouth. Bertrand went into the cabin, and informed Napoleon, who came on deck at half-past four in the morning, and remained on the poop till the anchor was dropped in Torbay. An officer immediately came off with admiralty despatches, strictly forbidding any communication with the shore; but no sooner was it known that Napoleon was on board, than the "Bellerophon" was surrounded by a crowd of boats filled with people of all ranks eager to gain a sight of the illustrious stranger.

On the 26th, the "Bellerophon" was ordered round to Plymouth Sound. Upon its arrival there, two frigates took up anchorage on each side, and a strict watch was kept day and night. No shore boat was permitted to approach within cable's length of the ships. Nothing, however, deterred people of all ranks, and of both sexes, from striving to get a view of Napoleon. They flocked to Plymouth from distant parts of England, and engaged boats at any price to take them within view of him. On one occasion, Captain Maitland says he counted upwards of a thousand, each containing, on an average, eight individuals. As the report that he was to be treated as a prisoner became confirmed, testimonies of respect and sympathy towards him increased. When he appeared, the men uncovered their heads, and frequently cheered him, and red carnations were extensively worn, as being one of his colours. On the 31st, Sir Charles Bunbury and Admiral Keith came on board to communicate to the emperor the resolutions of the English government respecting him. Having heard the despatches, he then, with great calmness of manner and mildness of countenance, declared that he protested against the orders which had been read. "I am come," he said, "voluntarily, to throw myself on the hospitality of your nation; I am not a prisoner of war, and, if I were, I have a right to be treated according to the law of nations." In referring to the gratuitous humiliation inflicted by the English ministry in deciding that he should be treated merely as a general officer, he spoke with much feeling about the insult thus thrown upon a fallen foe: "I was emperor," he said, "acknowledged by all the powers in Europe, excepting Great Britain; and she had acknowledged me as Chief Consul. I am prince, or Consul, and ought to be treated as such, if treated with at all." Shortly afterwards, he wrote a second letter to the Prince Regent, and drew up a formal protest against his proposed banishment to St. Helena. No answer, however, was ever returned either to his letters or protests. Amongst other plans devised in his favour, by his sympathisers on shore, the following is worth repeating. A London newspaper, in ignorance of the law, suggested that he should be got on shore by means of a Habeas Corpus (which does not extend its influence over prisoners of war). This hint, though not acted on, suggested to an individual who was prosecuted for a libel upon a naval officer, the idea of citing Napoleon as a witness, to prove the state of the French navy, which he affirmed was necessary in his defence. Armed with a writ for this purpose, the party in question came to Plymouth to serve it on Admiral Keith; who, more of a sailor than a lawyer, no sooner heard that he was being sought with this object, than he hurriedly fled from his house at Plymouth, and got on board the "Tonnant," lying in the Sound. His dreaded pursuer followed, and as he attempted to board the ship on one side, the admiral got out at the other, and rowed off at full speed in his twelve-oared barge. The man of law hotly pursued, and the alarmed admiral only escaped through the greater swiftness of his boat.

It was now announced that the "Northumberland," bearing the flag of Admiral Cockburn, was appointed to carry Napoleon to St. Helena; and that ship made its appearance on the 6th of August, attended by two frigates. Napoleon received the intimation without further remonstrance, and from this time submitted with firmness to his fate. As he was permitted only to take with him a selection from his suite, he chose counts Bertrand, Montholon, and general Gourgand, to whom he was allowed to add count Las Casas. The following day was appointed for the embarkation in the "Northumberland." Soon after breakfast it was announced that the admiral's barge was in waiting, and after a polite and friendly farewell to Captain Maitland, he descended the gangway with a firm and steady step.

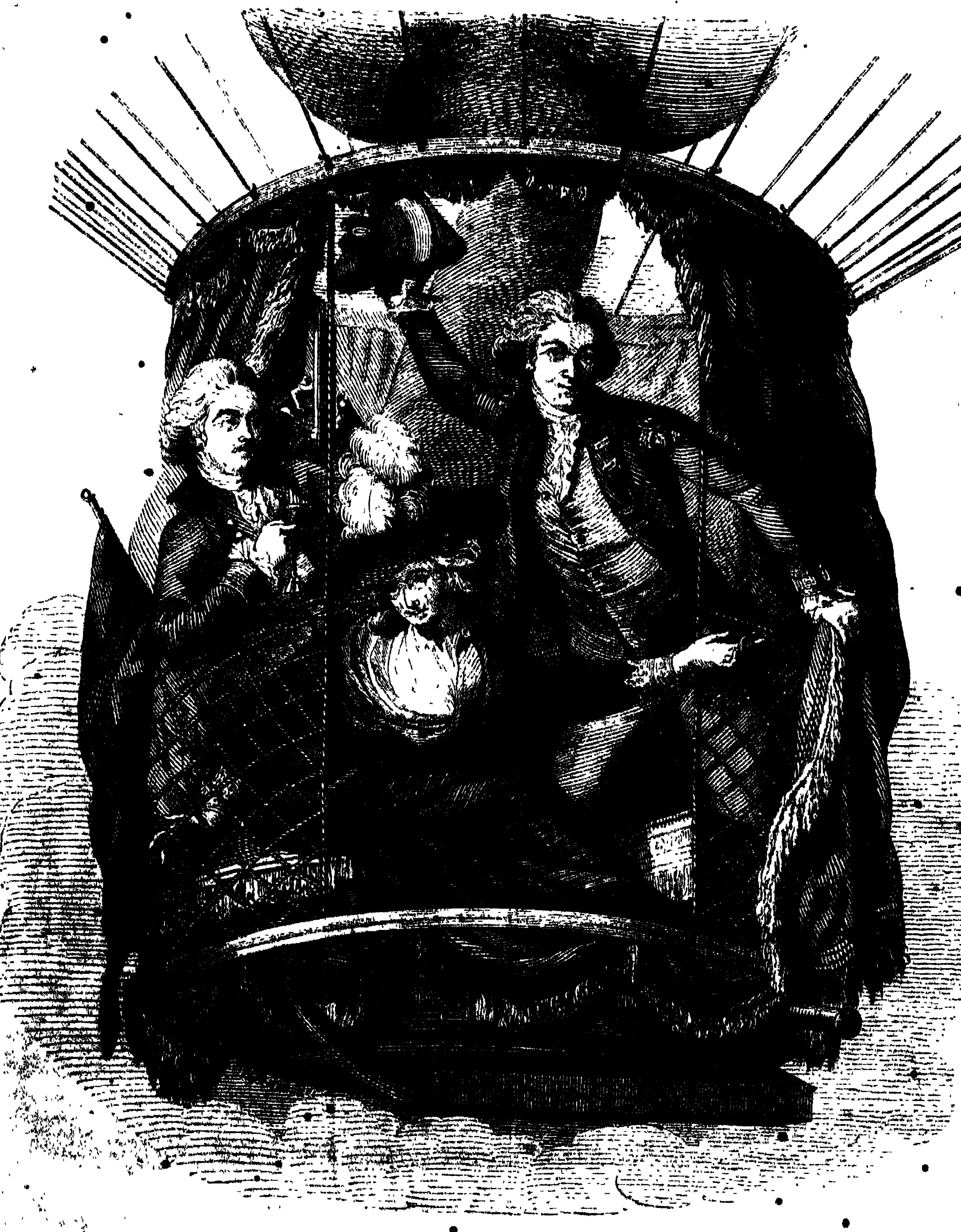


NAPOLEON BUONAPARTE EMBARKING IN THE BELLEROPHON.

The parting on board the "Northumberland" from those of his suite who were not permitted to share his exile was painful in the extreme; Savary and Lallemand wept like children. The ship sailed soon after, and about the 16th passed Cape la Hogue, when Napoleon took his last look at France. On the 16th of October he landed upon the dreary and miserable rock which was henceforth to be his prison, "and thus," says Scott, "the emperor of France, nay, wellnigh of Europe, sunk into the recluse of St. Helena." Here, to the further and ineffaceable disgrace of the English government, he was subjected to vexatious and insulting restrictions as cruel as they were unnecessary, until death ended his sufferings and his humiliation on the 3rd of May, 1821. In his will he had expressed a wish that "his ashes should repose on the banks of the Seine, in the midst of the French people whom he had loved so well;" but for nearly twenty years he lay buried in a spot near Longwood, the place of his residence in the island. In 1840, however, his last desire was fulfilled, and the church of the Invalides now contains the ashes of

> ——— "That wondrous man!
> Whose daring spirit, with volcanic rage,
> Breathed flame and ruin on the affrighted world.

BALLOONING.



ASCENSION OF MADAME SAGE, CHEVALIER BIGGIN, AND CAPTAIN VICENTE LUNARDI, IN A BALLOON, JUNE 20, 1785.
FROM A CONTEMPORARY ENGRAVING.

No modern discovery in science produced so great a sensation as that of ballooning or aerostation, in the year 1785; and yet there is not one which has been so barren of useful results. Locomotion both by land and water has made astonishing progress within the last century, but nothing has been achieved in air navigation beyond a little greater security, and the power of ascending or descending at pleasure. The voyager is perfectly at the mercy of the currents of air as to the direction he shall take, and must trust to chance for reaching a safe landing-place;—so that the present position of aeronautics may be compared to that of sea navigation when the first adventurous mortal committed himself to the treacherous deep in the hollowed trunk of a tree. This would form a matter of surprise, considering that the ablest scientific men have given their attention to the subject, in the hope of turning ballooning to some practical account, and making it serviceable to social progress and civilisation, did we not remember that the aeronaut has to trust completely to the caprices of one element. The seaman is enabled to make *two* subservient to his will by opposing their forces. The action of the wind upon his sails is controlled and regulated by the action of the rudder on the water. It is this difference which destroys all analogy between the two modes of sailing, and renders the rules and experiences of the one totally inapplicable to the other, and will, doubtless, for long enough leave aerostation, in the hands of harebrained adventurers, a means of amusement for crowds at public fêtes.

From the remotest ages of antiquity men seemed to have entertained the desire to imitate the flying of birds, and their ingenuity was, therefore, for two thousand years and more taxed to produce wings that would elevate them in the air. To enumerate all the ridiculous experiments that were made with this view, would be neither interesting nor instructive. It is a striking instance, however, of the length of time that a simple truth may remain before men's eyes before it is laid hold of; and of the want of experimental research amongst the ancients, that the physical law upon which all ballooning must depend—that every time that a body is plunged in a fluid heavier than itself it will float, was entirely overlooked. Their whole attention was directed to the making of strong wings, like those of birds, forgetting that, even if they had the immense muscular power necessary to work them, the buoyancy which birds possess by means of the immense number of minute air cells diffused all over the body, would be wanting.

It is in virtue of this law which we have mentioned, that a cork floats on the water, and that a cannon-ball floats in mercury, and also that a cloud floats in the air, but with this difference in the last instance;—the cloud does not float on the *surface* of the atmosphere, but at a height where a volume of air equal to itself in size is also equal in weight. Liquids can be but slightly compressed in bulk, but it is not so with air; for the atmosphere close to the surface of the earth, having to support all the weight of the upper strata, is much heavier than the air at any other part. That is to say, if you take a cubic foot of air close to the earth's surface, it will weigh much more than a cubic foot taken at an elevation of 10,000 feet, because it is much denser. If, then, you set at liberty at the surface of the earth a body lighter than an equal volume or bulk of air, it will rise rapidly. But as each successive stratum of air becomes lighter and lighter the higher it goes, it will at last reach a position in which the volume of air equal to itself in size will only equal it in weight also, and there it will stop. The whole theory of ballooning rests on this simple fact.

A Jesuit named Lana, who lived in 1670, was the first who attempted to turn it to any account. He proposed to raise a vessel by means of metal balls, strong enough, when exhausted, to resist the pressure of the outward air, but still thin enough, in the same circumstances, to render them lighter than their bulk of air. It is now very well known that it would be impossible to combine the two qualities of thinness and strength in the degree necessary for such a purpose; but this was not the obstacle which suggested itself to the good father's mind, but another and very different one, certainly not more ridiculous than those which many brainless, but well-meaning people at the present day attempt to throw in the way of scientific progress. He had no doubt whatever, that so far as physical conditions were concerned, the experiment would be perfectly successful, but he felt assured that God would never allow an invention to succeed which might so readily be made use of to disturb civil government!

In 1782, however, two brothers named Montgolfier, manufacturers of Anonay, a town in France, near Lyons, taking a hint from Lana, and the common experiment of soap bubbles, made the first balloon. They were paper makers, and at first conceived the idea of filling a large paper envelope with hydrogen gas, which, as doubtless most of our readers know, is considerably lighter than atmospheric air. But they soon found that the hydrogen tore the paper, and this plan was therefore abandoned. It appears that they were under the impression that the clouds owed their buoyancy to the influence of electricity, and that electricity diminished the weight of bodies to which it was applied. They, therefore, determined upon lighting a fire under a balloon, not to rarefy the enclosed air, but to increase the electricity of the vapour in the interior. They constructed for this purpose a balloon, having the form of a spherical globe, thirty-three feet in diameter, and one hundred and ten in circumference, and capable of containing twenty-two thousand cubic feet (French). It was made of canvas, with doubled paper, and weighed rather more than five hundred pounds. Under the opening at the bottom a fire of straw was lighted, which soon introduced twenty-two thousand cubic feet of heated air, which was consequently much lighter than the air around; for, as most of our readers are doubtless aware, one of the properties of heat is to cause any body to which it is applied to expand, and make it occupy a larger space than when cold. Thus a volume of air heated to the temperature of boiling water is 37-100ths larger than when at the temperature of zero, and is almost twice as large when at 482° F. This then, had, of course, a great tendency to rise, and had no resistance to contend against except that made by the weight of the balloon itself. But as soon as it had become so light that its own weight joined to that of the covering was less than that of an equal volume of the external air, the balloon, of course, rose majestically, although Montgolfier had mistaken the agency which he employed. The success of this experiment caused it to be repeated in various parts of the country; and in October, 1785, Pilatre des Rosiers and the Marquis d'Arlande ascended with great intrepidity, in a basket attached to the balloon, to the height of between three and four hundred feet. The balloon, however, was fastened to the earth by ropes.

It appears that the brothers Montgolfier did not attach any extravagant or visionary ideas of importance to their invention. With the modesty and simplicity characteristic of men of science, the limits they assigned to its usefulness were the relief of a besieged town by sending in provisions, the raising of wrecked vessels, the reconnoitring of the position of an army or of vessels at a great distance. It was applied to one of these purposes by the French at the battle of Fleurus, who prevented a surprise by means of it.

Many other ascents were made, displaying a greater or less amount of hardihood, but great fears were still entertained that at some time or other the balloon might take fire and precipitate the unfortunate voyagers to the earth. This *did* occur in one instance, when two persons were killed. Invention was therefore for some time on the rack to discover some means of ascent that would obviate the necessity of taking up lighted fuel. M. Charles at last conceived the idea of making the balloon of silk, and inflating it with hydrogen gas, a body five times lighter than air. An experiment made on this plan on the 27th August, 1785, succeeded completely, and from that moment aerostatic ascents lost most of the danger which had previously attached to them; and though the expense of a hydrogen balloon was much greater than a fire one, it was more than counterbalanced by the additional security afforded to the aeronaut. The process of inflation is very simple. It consists in putting a quantity of iron filings, and sulphuric acid diluted in water, in hermetically sealed vessels. The water then immediately begins to decompose; the oxygen which it gives off combines with the iron, and the hydrogen is conducted into the balloon by pipes.

Ascents were now made in rapid succession. Some took up wings and a rudder; others oars, but found them of no use. Every effort to direct their course was unavailing. During the years 1783-4 and 5, the number of ascents made in various parts of France was truly astonishing, as ballooning was then a novelty; and the opinion was generally entertained that it might lead to some valuable results. In one or two of the voyages the channel was crossed with great rapidity.

The first balloon sent up in England was by Count Zambeccari, from the Artillery-ground, London. It was filled with hydrogen, and was ten feet in diameter; it was found forty-eight miles from London, near Petworth. In September, 1784, Vicente Lunardi ascended, accompanied by a cat, a dog, and a pigeon, and descended in safety at Standon, near Ware. Having acquired more confidence, he made another ascent in June, 1785, in company with Madame Sage, and Chevalier Biggin. After remaining some hours in the air, they descended safely some miles beyond Harrow, having gone over a space of nearly twenty miles in two hours. Lunardi then went up alone, and alighted again some twenty miles farther on, and having stayed a short time at the house of a friend, and taking flight once more, he passed over Chester, and landed near Taporly Castle, having travelled upwards of two hundred miles in four hours. Many engravings of this ascent were published at the time, from one of which ours is taken.

The invention of descending by means of parachutes followed closely upon that of ballooming itself, but has led to no better results. The air, as every one knows, opposes considerable resistance to anybody moving with rapidity, and the greater the rapidity the greater the resistance. Experiments have shown, that if the rapidity with which the body moves be doubled, the resistance offered to its motion by the air is quadrupled; and if the speed be tripled the resistance becomes nine times greater—or in scientific language, the resistance of the air increases as the square of the rapidity with which the body moves. Consequently, when a body falls through the air, the acceleration of speed which it receives at first gradually diminishes until it becomes uniform. The resistance increases also in proportion to the extent of the surface presented by the body in motion, so that the greater the surface of a falling body, the more slowly will it descend.

Upon these principles parachutes are constructed in a form somewhat resembling an umbrella. In 1784, some experiments were made by M. Lenormand, a professor in Paris, which seemed to promise favourably, but in 1802 Garnerin made the first serious trial of them, by descending 2000 feet in the presence of a vast crowd at Paris. After cutting the cord which united the parachute to the balloon, the former oscillated frightfully, but finally reached the earth without any accident. He repeated this feat in the Mary-le-bone Fields, near London (now Regent's Park), with the same success, but with no less danger. More recently, an unfortunate man named Cocking, attempted to descend in a parachute of his own contrivance from a balloon at an immense elevation. The machine collapsed, and he was precipitated to the earth some thousands of feet, when he was of course picked up lifeless. Since then, no one has had the hardihood to follow his example.

Three voyages have been undertaken since the commencement of the present century for scientific purposes. In 1804, MM. Gay-Lussac, and Biot, ascended at Paris to a height of 13,000 feet, provided with apparatus, and in the same year the former ascended alone to a height of 23,000 feet. They made some very important observations upon atmospheric and meteorological phenomena. In 1806, Carlo Brioschi, the astronomer-royal at Naples, and Signor Andreani, endeavoured to reach a still greater elevation, but the balloon burst in consequence of the great rarefaction of the air. Its remains proved, however, sufficient to save their lives.

Many attempts have been recently made to guide the balloon in its course, but not one has proved successful, and the public has heard so much of aerial machines that could never be got to leave the earth, of rudders that would not steer, and engines that would not work, that every one who purposes to turn ballooning to any practical good, is now looked upon as a visionary. In the search for Sir John Franklin and his gallant companions it is likely, however, to prove of essential service. Sir Edward Beecher's expedition has been furnished with a number of small balloons, to be sent up charged with a number of slips of printed paper, stating the position of the squadron, and where food may be found. These are arranged in such a way, that they become detached *en route*, by the burning of a slow match, and are scattered over the country. Let us hope that they may be the means of bringing relief to worn-out voyagers and redeem the falling fame of aerostation.

The silly exhibitions with which the public were disgusted last summer, by fools ascending on the backs of ponies and other animals cannot be too strongly reprobated and condemned. They serve no one purpose of instruction or legitimate amusement, while they feed the depraved taste for strong excitement, which is one of the worst features in the moral constitution of the lower classes at the present day. It is evident that aerostation, as now practised, promotes no good, and places lives in unnecessary danger, and certainly should be placed under more watchful supervision by the authorities.

MESSRS. ELKINGTON, MASON, & CO.'S ELECTRO-PLATE WORKS,

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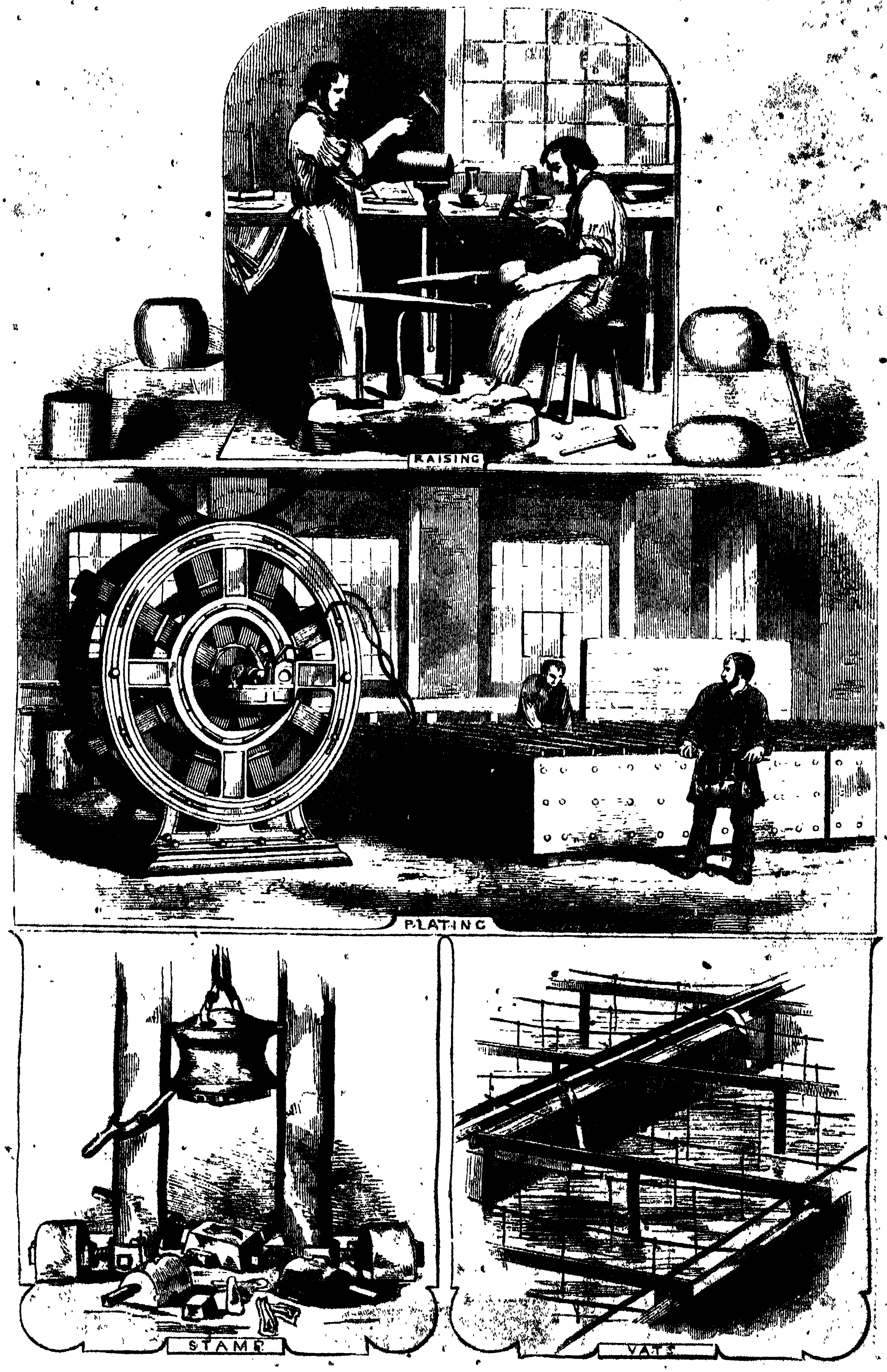
If one striking feature of the present times is, that vast establishments for business spring up, like the gigantic oaks which fairy tales describe as having grown in a night, another is not less remarkable, that many of them originate in the practical application of some principle which science has but recently developed; and of both, the manufactory now to be described affords a deeply interesting exemplification.

It is now regarded as an established law, that, wherever chemical action occurs, there is a disturbance of the electric equilibrium, and the consequent development of free electricity. Electricity is also constantly elicited when different metals are brought into contact with an intervening fluid. Thus, a singular sensation is produced by making a piece of zinc and a piece of copper meet over the moist tongue, when placed in the mouth; and if two plates of these metals are merely pressed together and suddenly separated, they assume opposite electric states—the zinc being *positive*, and the copper *negative*, the former acquiring *more* than its natural quantity of electricity, and the latter suffering some diminution of it. If, too, a plate of pure zinc is dipped into a glass of very dilute sulphuric acid, little or no action is observed, nor does anything happen when a similar plate of silver is placed in the same glass, provided the metals be kept apart from each other. But if the zinc and the silver be brought into contact at their extremities out of the liquid, the water is decomposed; its oxygen combines with the zinc to form oxide of zinc, which is dissolved by the acid; and its hydrogen passes over to the surface of the silver, where it collects, and ultimately escapes in gaseous globules. Meanwhile, a continuous current of electricity is passing from the zinc across the water to the silver, and again from the silver, by metallic contact, to the zinc.

The observation of this electric action led to the construction of a battery, a familiar form of which is a series of zinc and copper plates soldered together, and placed in a trough with intervening cells, which, when action is required, are filled with proper acid or saline solutions. On this arrangement various improvements were made; but in them all the electric power was liable to fluctuation, while various causes induced such a falling off of its evolution as to render such batteries inconvenient or even useless, where continuous or regular action is required. The most important modification of this instrument was therefore, at this period, the one devised by the late Professor Daniell, and which he termed a "*constant* battery."

In the use of this battery a most important and valuable discovery was made. One of the liquids employed was a solution of sulphate of copper, and as an electrical current passed through it, the sulphate was decomposed; and the copper, separated from the acid with which it had been combined, was deposited in a very fine metallic state on the inner surface of the vessel that contained the liquid. It was afterwards found, on removing such a film of copper from the vessel, that it presented an exact counter-type of the surface on which it had been cast, when separated from the acid by electrical action.

The discovery was speedily turned to account by various persons; and if our readers made no experiments of the kind—of



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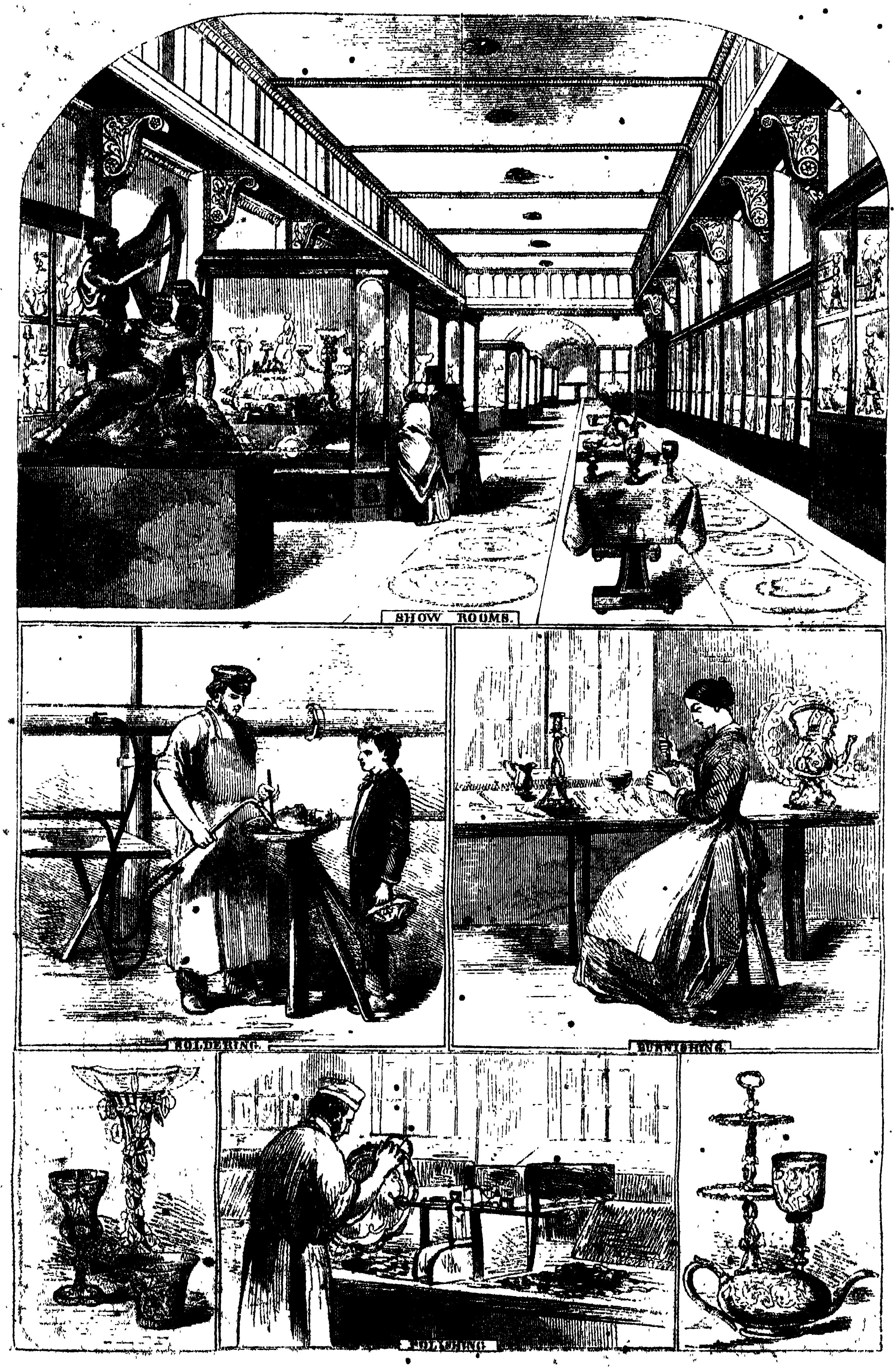


MESSRS. ELKINGTON & CO'S. ELECTRO-PLATE WORKS.

thickness is obtained; and in this way articles might even be made solid. To such perfection has the process been brought, that not only are silver waistcoat-buttons and exquisite pieces of *bijouterie* produced, but a statue of bronze, as large as that of the Duke of Wellington at Hyde-park Corner, could be made of any thickness merely by electrical deposits. Even flowers and butterflies may be coated with gold and silver.

The general impression may for a moment be alluded to, that, as in the case of electro-plated goods, bronze forms only a covering to another substance, while, in fact, the figures are hollow, and the entire substance employed is unalloyed bronze. To produce an electro-deposited figure, the model of it is formed, and from this a mould of fine clay or plaster is taken, the interior of the mould being thus an exact counterpart of the exterior of the model. On this being placed in a trough containing a solution of copper, the mould is rendered conducting, and the metal, gradually deposited inside the mould, becomes, in its turn, an exact counterpart of the original model. It will be understood from this brief description, that from the metal not shrinking in cooling, as in ordinary instances of casting, beauties and faults must alike be copied. The product in bronze is, in fact, an exact reproduction of the artist's conception, unalloyed by any mechanical imperfection almost necessarily attendant on the old process.

To resume our description of the manufacture of electro-plate: the articles subjected to the electro process having been washed and dried, now only want the finishing *polish*. Waiters, and other products of a similar kind, have therefore their flat surfaces placed on an anvil of glossy brightness, and are unscrupulously subjected to the violent action of a heavy hammer with an unimpeachably smooth face. The effect is to bring the silver into more close communication with its foundation of white metal, and to show the soundness of the previous work, as any flaw in it would now instantly appear. So entire is the union, that on any article being struck with the fingers, it rings like silver, and will even sustain a red heat without injury. For those who object to electro-plated goods, from an apprehension that the surface is liable to peel off, such tests, it might be supposed, would be perfectly satisfactory.

Articles after having been duly hammered are taken to the *burnishing*-room. Here are assembled from forty to fifty women, who, with small steel tools and a little water to keep them from becoming hot, give a beautiful polish to numerous articles. On a reference to the second page of illustrations, an engraving of this process will be observed. On the table appear a number of tools and of finished articles. After a little colouring with rouge, to give what is brought into this department a deep lustrous appearance, they are completed, and ready to be placed in the show-room, or to be despatched to their final destination. At the bottom of the page just referred to, may be observed the teapot whose history has been sketched, which, after having been engraved, was plated and burnished, and then had ivory placed in the handle to prevent the fair fingers by which it will hereafter be used, from suffering the slightest discomfort. It, therefore, appears now in all its charms, to attract the attention and to justify the choice of an early purchaser.

THE FIR.—No. II.

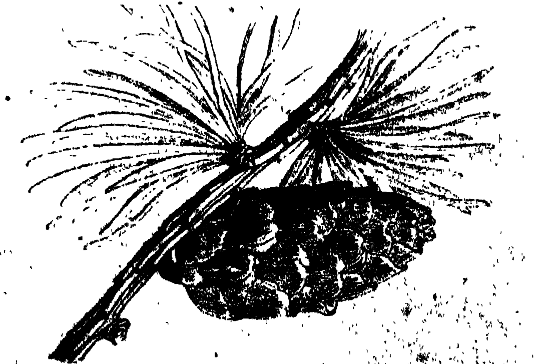
AS promised, we resume and conclude our brief sketch of the principal species of the fir tree —

The *Pinus Canadensis*, or American and Newfoundland spruce-fir, is a native of Canada, Pennsylvania, and other parts of North America. It includes three varieties, the white Newfoundland spruce, the red spruce, and the black spruce. These, however, differ so little, that one description may answer for all. The average height attained by all three is about one hundred feet. They are of upright growth, and their leaves, like those of the Norway spruce-fir, are green, and garnish the branches in the same beautiful manner as do those of that species, only that they are narrower, shorter, and stand closer. The greatest difference between the three varieties is observable in the colour of their cones. Those of the white are of a very light brown; those of the red of a nut-brown or reddish appearance; and those of the black spruce of a dark or blackish hue. It is from these differences of colour that the threefold division of the species has arisen. The cones of all three are terminal, ovate, and scarcely longer than the leaves, which are about an inch in length. The anthers are capitate beaked; and the common filament twice as long as the bracteas. The tree flowers in May.

Fig 1.

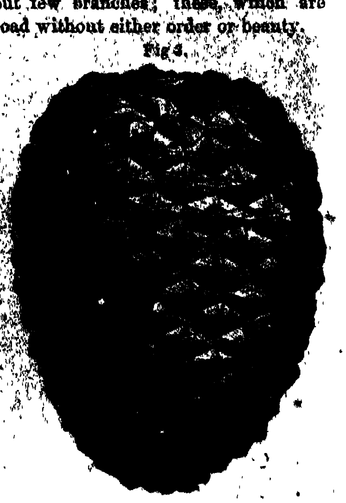
The *Pinus balsamea*, or hemlock-fir, which is a native of Virginia and Canada, is classed by some botanists under the species *abies*—which we have previously described. This tree possesses as little beauty as any of the fir tribe, though its comparative scarcity renders it valuable. It is of slow growth, and has but few branches; these, which are long and slender, spread abroad without either order or beauty.

Fig 2.



The *Pinus strobus*, or North American white pine, called also the Weymouth pine, from its having been first introduced into Europe from America by Lord Weymouth, is a tall, slender tree of great beauty. The trunk is covered with a dark-green and very smooth bark, which, however, in old trees becomes cracked and scaly. The leaves are long and delicate, five generally growing out of one sheath. In the forests of North America these trees frequently attain a height of two hundred feet. Their

Fig 3.



cones, which are soft and spongy, are somewhat cylindrical in shape, and about six inches in length; they are covered with convex shaped pointed scales, as seen in fig. 3.

The *Pinus tæda*, or swamp pine, is a tall evergreen tree, and a native of the swamps of Virginia and Canada. There are several species of it, differing slightly from each other; but they present no features of peculiar interest to the botanist.

The *Pinus cedris*, ranked by Tournefort and some other botanists under the species *larix*, is that popularly known by us as the *cedar of Lebanon*, and called by the ancients *cedrus magna*, and sometimes the Phœnician or Syrian cedar, from the country where it grows in the greatest perfection. This magnificent tree is a coniferous evergreen, of the larger sort, bearing reddish ovate cones, covered, as seen in the engraving (fig. 4), with smooth close scales; the leaves are small, narrow, and thickly set upon the stocks of the branches. The reddish colour and strong aromatic smell of the timber of both trees has sometimes led to the wood of the cajou tree being mistaken for that of the cedar. To an unpractised eye the difference is, at first, not easily observable. The most remarkable characteristic of cedar-wood is its great duration, arising from the extremely bitter taste, to which it owes its entire freedom from the attacks of worms. For this reason the ancients used cedar tablets to write on, especially for things of importance as appears from the expression of Persius—*et cedra digna locutus*. This bitter juice was extracted for the purpose of smearing books and writings, to preserve them from decay. We are told by Pliny that it was by this means that Numa's books were preserved entire to the year 535. It was of the wood of this tree that, as the reader knows, Solomon's Temple and Palace were constructed. Cortes is said to have built a palace at Mexico, in which, as we are informed by Herrera, were seven thousand beams of cedar, most of them being one hundred and twenty feet long, and twelve feet in circumference. The mainmast in the galley of King Demetrius was a single cedar tree. Le Brun assures us that the two largest which he saw on Mount Lebanon measured, respectively, fifty-seven and forty-seven palms in circumference. In the Temple of Apollo at Utica there were some cedar trees said to be nearly two thousand years old. The wood of this tree is of so very dry a nature that it will not endure to be fastened with nails, from which it shrinks; it is usually secured with pins made of itself. When growing, its branches spread out horizontally, drooping towards their ends with their own weight. It is remarkable that, as far as has yet been discovered, the cedar is not to be found as a native in any part of the world but Mount Libanus, in Syria. Seeds and plants of it were obtained from Lebanon, and raised in England in the seventeenth century.

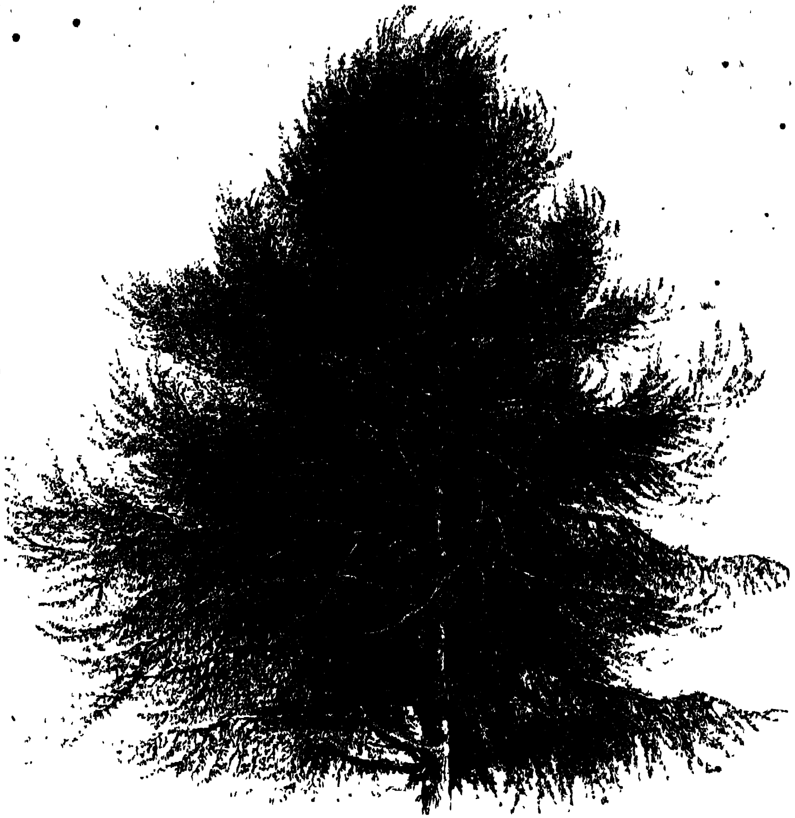


Fig. 1.

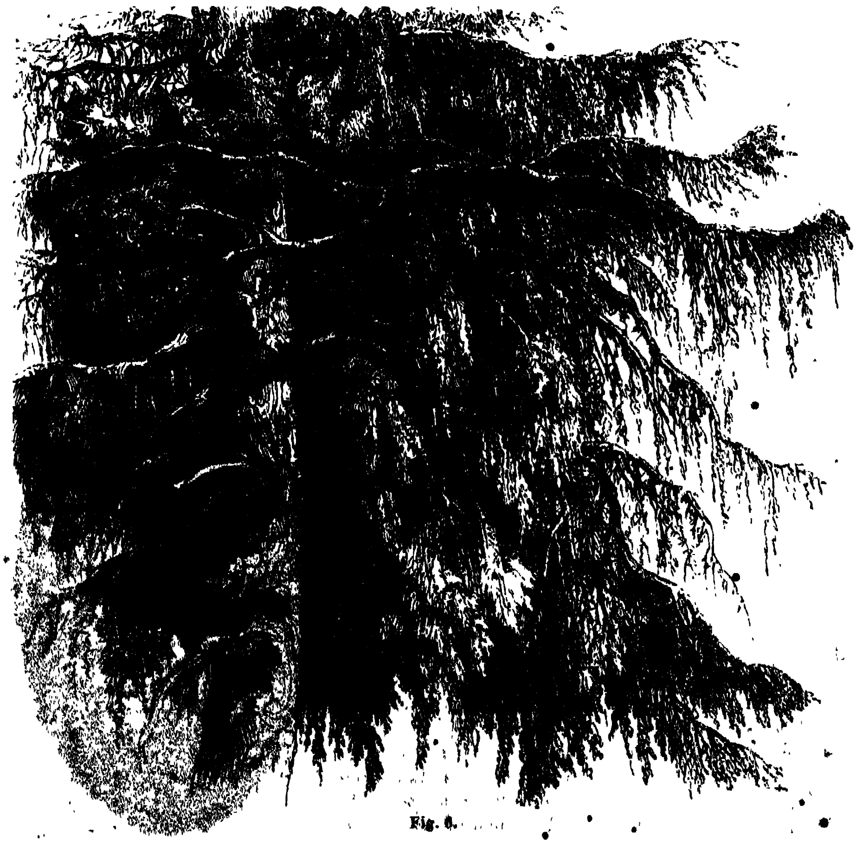
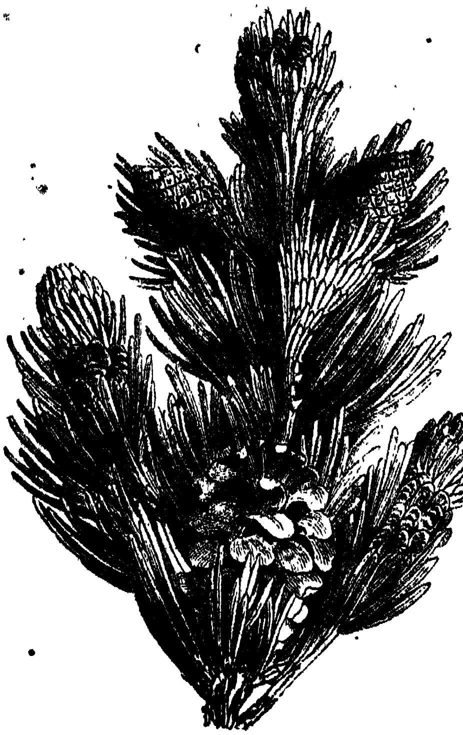


Fig. [illegible]

The most remarkable individuals of this species, in point of age, near

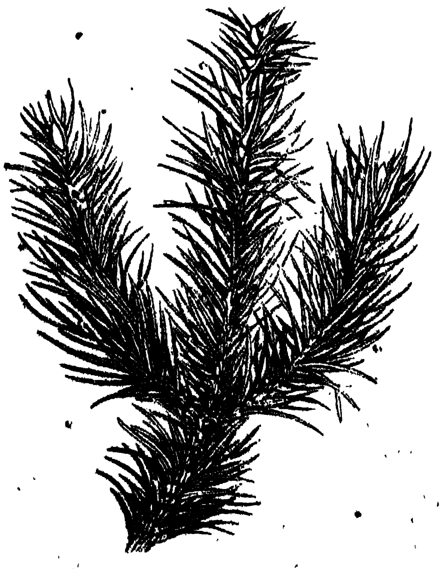
London, are those in the Chelsea Botanic Garden, now in a state of rapid decay. Till lately there was another fine old specimen at Hammersmith, in the garden of a house which was formerly occupied by Bishop Atterbury, the well-known diocesan of Rochester, in the reign of George I. At Enfield there is another very old cedar, by some supposed of a greater age than those at Chelsea. This tree has been a favourite subject of frequent allusion with both ancient and modern poets. In speaking of the forests of Caucasus, Virgil says of it, in his second "Georgic:" –

Fig. 5.



> "Heaven their various plants for use designs;
> For houses *cedars*, and for shipping, pines."

Fig. 7.



Lucan speaks of it as the breeding-place of the eagle; and Horace hopes that his verses may be as lasting as its wood. A long list of allusions to it by our own poets might be given: Thomson's beautiful picture will be sufficient:—

> ——— "On some fair brow
> Let us behold, by breezy summers cooled,
> Broad o'er our heads the verdant cedar wave."

The common, or white *larch*, which old botanists ranked under *larix*, is a tall and very graceful tree, with short, blunt, deciduous leaves of a bright green colour. It flowers in March and April, before the leaves fully expand, and it then presents a very elegant appearance. Its cones, as shown by the engraving (fig. 2), are ovate oblong, with the margin of their scales reflexed and jagged. It is a native of the Alps, Italy, Germany, and Siberia; and has been long cultivated very extensively and with great profit in this country. Poetical allusions to the larch are very rare in the works of the Greek and Roman poets. Ovid is supposed to refer to it in the following lines:—

> "The new-made trees in tears of amber run,
> Which harden into value by the sun."

The artist has given a very accurate drawing of this handsome tree in our illustration (fig. 4).

Fig. 6 is a sectional representation of a common mountain fir, in which the knarled character of the branches and the drooping foliage is well represented; fig. 7 shows the sharp, needle-like form, of its leaves on the stem.

Besides these principal species of the fir tree, there are a few others which might safely be grouped under some one of those which we have described. Some botanists have classed them as separate species, but they possess few features of sufficiently peculiar interest to justify the distinction. Perhaps the most distinct of these minor varieties is that called the *dwarf-fir*, of which our engraving (fig. 5) sufficiently illustrates the peculiarities. It is a low, stunted tree, of no beauty, with ovate pointed-cones, of which, when ripe, the margin of the scales is greatly reflexed. It is a native of the Carpathian mountains.

THE TRAGEDY OF STANTON HARCOURT.

On the south side of the church of Stanton Harcourt is a monument on which is inscribed:—

Near this place lie
The bodies of John Hewet and Sarah Drew,
An industrious young man
And Virtuous maiden of this Parish
CONTRACTED IN MARRIAGE;
Who being with many others at Harvest work,
Were both in one instant killed by lightning
On the last day of July,
1718.

> Think not by rigorous judgment seized
> A pair so faithful could expire,
> Victims so pure heav'n saw well pleased,
> And snatched them in celestial fire.
> Live well and fear no sudden fate
> When God calls virtue to the grave,
> Alike 'tis justice soon or late,
> Mercy alike to kill or save.
> Virtue unmoved can hear the call,
> And face the flash that melts the ball.

The story of this unfortunate pair created much interest at the time of their decease, and the following account of it was written by Gay (the poet) a few days after the melancholy event. "John Hewet was a well-set man of about five-and-twenty. Sarah Drew might be called rather comely than beautiful, and was about the same age. They had passed through the various labour of the year together with the greatest satisfaction; if she milked, it was his morning and evening care to bring the cows to her hand: it was but last fair that he bought her a present of green silk for her straw hat, and the posy on her silver ring was of his choosing. It was that very morning that he had obtained the consent of her parents, and it was but till the next week that they were to wait to be happy. Perhaps in the interval of their work they were now talking of the wedding clothes, and John was suiting several sorts of poppies and field flowers to her complexion, to chuse her a knot for the wedding-day. While they were thus busied (it was on the last of July, between two and three in the afternoon) the clouds grew black, and such a storm of lightning and thunder ensued, that all the labourers made the best of their way to what shelter the trees and hedges afforded. Sarah was frighted and fell down in a swoon on a heap of barley. John, who never separated from her, sat down by her side, having raked together two or three heaps of the barley to secure her from the storm. Immediately there was heard so loud a crack as if heaven had split asunder; every one was now solicitous for the safety of his neighbour, and called to one another throughout the field; no answer being returned to those who called to our lovers, they stept to the place where they lay; they perceived the barley all in a smoke, and then spied this faithful pair. John with one arm about Sarah's neck, and the other held over her as to screen her from the lightning. They were struck dead, and stiffened in this tender posture. Sarah's left eyebrow was singed, and there appeared a black spot on her breast; her lover was all over black, but not the least signs of life were found in either. Attended by their melancholy companions, they were conveyed to the town, and the next day were interred in Stanton Harcourt church-yard. My Lord Harcourt, at Mr. Pope's and my request, has caused a stone to be placed over them, upon condition that we furnished the epitaph, which is as follows:—

'When Eastern lovers feed the fun'ral fire,
On the same pile the faithful pair expire.
Here pitying Heav'n that virtue mutual found,
And blasted both that it might neither wound;
Hearts so sincere th' Almighty saw well pleased,
Sent his own lightning and the victims seized.'

But my Lord is apprehensive that the country people will not understand this, and Mr. Pope says he will make one with something of scripture in it, and with as little of poetry as Hopkins and Sternhold."

The epitaph engraven on their monument is that written by Pope, and to which Gay alludes above.

The "Celadon and Amelia" of Thomson was probably suggested by this catastrophe; but the poet has made the tragedy more touching by the escape of one of the lovers:—

" ———Young Celadon
And his Amelia were a matchless pair:
With equal virtue form'd, and equal grace,
The same, distinguish'd by their sex alone:
Hers the mild lustre of the blooming morn,
And his the radiance of the risen day.

They loved: but such their guileless passion was,
As in the dawn of time informed the heart
Of innocence, and undissembling truth—
'Twas friendship heightened by the mutual wish,
Th' enchanting hope, and sympathetic glow
Beam'd from the mutual eye. Devoting all
To love, each was to each a dearer self;
Supremely happy in the awaken'd power
Of giving joy. Alone, amid the shades,
Still in harmonious intercourse they lived
The rural day, and talk'd the flowing heart,
Or sigh'd, and look'd unutterable things.

So pass'd their life, a clear united stream,
By care unruffled; till, in evil hour,
The tempest caught them on the tender walk,
Heedless how far, and where its mazes stray'd,
While, with each other blest, creative love
Still bade eternal Eden smile around.
Presaging instant fate, her bosom heaved
Unwonted sighs, and stealing oft a look
Of the big gloom on Celadon, her eye
Fell fearful, wetting her disordered cheek,
In vain assuring love, and confidence
In Heaven, repress'd her fear; it grew, and shook
Her frame near dissolution. He perceived
Th' unequal conflict, and as angels look
On dying saints, his eyes compassion shed,
With love illumin'd high. 'Fear not,' he said,
'Sweet innocence! thou stranger to offence
And inward storm! He, who yon skies involves
In frowns of darkness, ever smiles on thee
With kind regard. O'er thee the secret shaft
That wastes at midnight, or th' undreaded hour
Of noon, flies harmless; and that very voice,
Which thunders terror thro' the guilty heart
With tongues of seraphs, whispers peace to thine.
'Tis safety to be near thee sure, and thus
To clasp perfection!' From his void embrace,
Mysterious Heaven! that moment, to the ground,
A blackened corse, was struck the beauteous maid:
But who can paint the lover, as he stood
Pierced by severe amazement, hating life,
Speechless, and fix'd in all the death of woe!
So, faint resemblance! on the marble tomb,
The well-dissembled mourner stooping stands,
For ever silent, and for ever sad."

THE BLOSSOMING SEASON.

OUR gardens and fields are now decorated with the beauties of Spring, and the country presents the most delightful aspect. The eternal word of the Creator, pronounced when he formed the world, has produced all these effects; his all-creating hand has again renovated the earth, and, in a measure, created it anew for the pleasure and happiness of his creatures. It is God alone who calls for the Spring, and orders it to appear. Approach, O man, and try what thy wisdom and power can execute! Canst thou make one tree to blossom, or one leaf to germinate? Canst thou call from the earth the smallest blade of grass, or order the tulip to rise in all its splendour? Contemplate these flowers; examine them with attention. Can they be more perfect, can their colours be more beautifully blended, or their forms more elegantly proportioned? Can the pencil of the painter equal the warmth of the blossoming peach, or imitate the richness of a cherry-tree in bloom? So far from imitating, no one can conceive all the beauties of renovated nature; and if there were no other proofs of the power and wisdom of God on the earth, the flowers of spring would sufficiently display them. Every tree that blossoms, every plant, every flower, manifests a portion of that wisdom and beneficence so abundantly diffused through the earth. There is an infinite diversity among the blossoms of trees; though all beautiful, they differ in degree, one surpassing another; but there are none which do not possess some beauty peculiar to themselves. Some have flowers of a pure white, others have streaks of red, and shades, and add to beauty and elegance the most exquisite fragrance. But all these multiplied varieties do not affect their fecundity.

From the consideration of these circumstances we may receive profit and instruction. We may reflect that, though we are not favoured with the same advantages that some possess, we should be neither discouraged nor afflicted. The privation of some accidental benefits can in no degree injure our well-being. Though we may not be quite so rich, so powerful, or so handsome as some are, those are trifling things in the estimation of the virtuous and the wise; for without them we can be equally happy, equally useful to our fellow-creatures, and equally pleasing to God. True beauty consists in the works of piety and the fruits of virtue. The blossoms of a fruit-bearing tree please more than the splendour of the tulip, or the richness of the auricula; because from the one we expect, when the blossoms are over, to receive fruit; while the others please for a moment, and are seen no more. Let us not then prefer the mere lustre and charms of external beauty; the rosy tints of health, the elegance of form, and the freshness of youth are fleeting, and soon fade; they alone cannot secure present peace, nor durable happiness. Those blossoms only which promise fruit worthy of God, and useful to mankind, deserve our regard, and merit our approbation. As the beauties of the blossoming trees hastily perish, so will the youth, now in the spring of life, fluttering in the gaiety of their charms. Let those, then, who are in the morn of life, and in the vigour of health, prepare, by study and application, to produce in the evening of their days, when divested of all external charms, the abundant fruits of piety, of virtue, and of knowledge.

THE LITTLE FARMER.

COUNTRY scenes and employments have an irresistible charm for everybody. Not that we can point out exactly what it is in the old ivy-grown wall, or the thatched roof, or the busy farmyard, or noisy barn-door fowl, that interests us; nor can we say that there is what may be called positive beauty in the round face of the girl in our engraving, or the disordered attire of the chubby urchin at her side. But there is truth and life and reality in every one of them, enough almost to prove, after all, that an eclogue is the poem which adheres closest to nature, and is, at the same time, the most complete, because with force it unites simplicity, and with simplicity, grace. Its descriptions and sentiments are always true, because rustic life is nearly always the same, now as when Tityrus and Melibœus gossiped two thousand years ago under the shade of the wide-spreading beech.

DRAWN BY FREEMAN, FROM A SKETCH BY LOUTHERBOURG. ENGRAVED BY PATAS.

In towns men hardly understand their real position, or the end for which they are working. They are like soldiers, moved in masses from one point to another, and know not the end for which they are brought together; nor is it necessary that they should. Their occupations are purely conventional; they do their share of the work, but they do not see the results. Their labour is lost sight of in the complications of the great social machine. Not so in the country. There, nothing is obscure. The means are employed, and the results appear in due season. Rustic life affords plainer evidences than any other that man is fulfilling the mission assigned him by Providence. It is in it that he truly exercises dominion over the earth and its creatures, and makes both work together for his good. Agriculture has been the cradle of modern society, and to this day it is its mainstay and hope. Men who are condemned to live in the haunts of manufacturing and commercial industry, rush to the fields whenever leisure allows them, and gaze with rapture upon landscapes, even when transferred to canvas.

The scene before us is a simple one, but most characteristic, and well supports the artist's fame for truth and ingenuity. Philip James de Loutherbourg was born at Strasburg in 1740. His father was principal painter to the Prince of Hanaudarmstadt, but intended to enter his son in the engineer department of the army, while his wife was anxious to bring him up for the Lutheran ministry. He however received a liberal education at the college of Strasburg; and as he manifested a great inclination for painting, his parents sent him to Paris to study under the celebrated Carlo Vanloo. He made such progress that he was elected a member of the French Academy of Painting, though it was one of their rules that no one should be admitted who had not reached his thirtieth year. He then travelled in Italy, Germany, and Switzerland, and painted a great number of pieces, not only landscapes but battles, sea pieces, and portraits. In 1771 he came to England, and was employed by Garrick in the decoration of Drury Lane Theatre. In 1782 he invented a new sort of exhibition, which he called Eidophusikon, a series of moving pictures, something like a "panorama"; but the undertaking was by no means successful. In the same year he was elected a member of the Royal Academy. He painted the "Review of Waverly Camp," now in the possession of her Majesty, the history of Lord Howe, and some other pieces of a similar nature. He died at Chiswick in 1812.

SIR DAVID WILKIE.

Our readers may remember that in the sketch of the life of Benjamin West, with which we some weeks ago presented them, we mentioned as one of the most interesting circumstances in his singularly successful career, the love of art which he displayed when he had scarcely emerged from infancy. Most biographers tell, it is true, of the early fondness of their heroes for the pursuits in which they afterwards distinguished themselves. Napoleon was a military leader at Brienne, and Ferguson was fired with enthusiasm for science when tending a farmer's sheep upon a mountain pasture. How much of great men's success is to be ascribed to circumstances which began their operation only when youthful fire had begun to pale, and how much to impulses or tastes which grew up and flourished in their boyhood, it is not our present purpose to inquire. It must be acknowledged, at all events, that experience justifies us in asserting, that most of those who have excelled in the imitative arts at least, have in early life given strong and unmistakeable indications of their destiny. Amongst the hundreds of great names whom we might cite in support of our position, David Wilkie stands pre-eminent. Before he could read he could draw, before he could spell he could paint.

DRAWN BY OSWALD MURRAY FROM A PAINTING IN THE NATIONAL GALLERY. ENGRAVED BY H. LINTON.

He was born in a quiet Scottish manse, in the parish of Cults, in Fifeshire, on the banks of the Edenwater, on the 18th of November, 1785. He was the third son of David Wilkie, minister of the parish, and Isabella Lister, his third wife. He was sent when seven years of age to a school in the neighbourhood, but so great was his indolence, or so deficient the teacher, that he learned nothing. When in his twelfth year he was removed to the grammar school of Kettle, of which Dr. Stoneham, now Bishop of Toronto, was master; but here, also, to his father's great chagrin, his progress was no better. Neither threats nor entreaties could win his attention to anything but drawing. So after a fruitless trial of eighteen months he was again removed. The elder Wilkie was now in a state of great perplexity. It was evident that his son was bent on being a painter; but, independently of a strong dash of good old Scotch contempt for everything that savoured of vanity, or mere decoration of house or person, the good minister did not see how his son was ever to earn his bread by painting. The truth is, that the votaries either of literature or art in the last century, were but too frequently obliged to worship at the shrine of their goddess with empty stomachs and threadbare coats. The mass of the people read but little; books, as well as pictures, depended for sale and success upon the whims and caprice of people in "high life," and many a broken heart and life of blasted hopes have attested how wretched and rotten that dependence is. If an author could not move the sympathies of some member of the *beau monde* by a whining sycophantish dedication, he died in silence in his garret, and left himself for the admiration of the world three generations afterwards. Picture buying was also necessarily restricted to the opulent and refined. Taste in matters of art was in a great measure confined to the *haute noblesse*, and they were not always very discriminating or very lavish in their favours to her followers. There was not then, as now, a large and wealthy and highly educated middle class, as distinguished for its encouragement of the beautiful as for its devotion to the useful, making up for its want of long descent by the practice of the highest and most graceful virtues of private life, and the stern and faithful discharge of public duties. Those were the days when to write or to paint was to live in Grub street, and to live in Grub street was to have about one meal in two days, and wonder that the world was so good as to let the wretched author or artist have even that.

No wonder, then, that Wilkie's father trembled for his son's future career when he saw him devoting himself to painting. No wonder that he used all his influence to induce him to adopt some less precarious calling. No wonder that his old grandfather, a "cannie" old covenanter, bid him follow the church as the surest means of earning an easy and respectable livelihood. But it has often been said that it is from our mothers we inherit our chivalry, our devotion to truth, to faith, to honour; our recklessness to consequences in pursuit of duty, the high and lofty gallantry which overlooks the danger and the toil, and sees only the light in the distance. It has often, too, been said that women's courage rises when men begin to shrink and waver. We see proofs of its truth every day. Here is another. Wilkie's mother encouraged him to follow his inclination, and won a reluctant consent from his father. He was then sent in 1799 to the Trustees' Academy in Edinburgh for the Encouragement of Manufactures, with some specimen drawings, and a letter of introduction from the Earl of Leven to Mr. Thompson, the secretary. The drawings were not considered satisfactory, and it was only at the earnest request of the Earl of Leven that he was admitted. He now made wonderful progress. Everything he attempted he executed with the greatest precision and faithfulness to leading principles. He showed himself a keen observer of nature and gave early indications of the after excellence of his *tableaux de genre*. He was a constant frequenter of scenes likely to furnish subjects for paintings of this sort—trysts, fairs, and market-places. In that species of drawing, we are told, in which taste and knowledge are combined, he was far behind many in the same class who had not a tithe of his talent; but though behind in skill, he surpassed all his companions in comprehending the character of whatever he was set to draw. He was always one of the first to enter the academy when opened in the morning, and invariably one of the last to depart; and his intense application during the hours of study drew upon him the ridicule of the other students, who frequently pelted him with small pills of bread. When the drawing hours were over he returned to his lodgings, and there laboured during the remainder of the day to carry out what he had begun in the forenoon, by sitting before a looking glass and copying his own face and hands, and thus endeavouring to blend his impressions drawn from the antique with those derived from a diligent study of nature. He had already begun to perceive the importance of the action of the hands in telling a story; and whenever he was unable to obtain a model which pleased him, he invariably introduced his own. In his picture of the "Blind Fiddler," which is now in the National Gallery, the hands of every one of the figures are drawn from his own, and also the expression of the heads. The girl leaning on the back of the chair is said to be very like what he was at the time.

In 1803 he won the ten guinea prize which had been offered for the best painting of "Callisto in the Bath of Diana." At the sale of his effects after his death this was sold for £48 6s. In the same year he made his first sketch of the "Village Politicians." He also about this time painted a "Scene from Macbeth," where the murderers sent by Macbeth to the house of Macduff meet with his wife and child. The expression of the boy who boldly answers their questions was so excellent, that Mr. Graham, the teacher of the academy, immediately on seeing it, predicted that he would one day arrive at eminence from his strong delineation of nature. In 1804, in his nineteenth year, he left the academy and returned home. While there he painted "Pitlessie Fair," in which he inserted one hundred and forty portraits of rustics of the neighbourhood, most of whom he sketched in church for want of a better opportunity. For this he only received £25 from Kinnear, a Scotch laird.

He also commenced portrait painting at five guineas a head. It appears that he got a good deal of practice in this way, but none of his works are remarkable for any great excellence. He finished a picture called the "Village Recruit," and took it with him to London when he went. It was exposed in a window in Charing-cross, and was soon sold for six pounds, the price marked upon it. Upon arriving in London he took lodgings at 8, Norton-street, and immediately obtained admission as a student in the Royal Academy. He does not appear to have been very much struck upon entering with the proficiency or good sense of his fellows. He remarked in a letter to a friend in Scotland, that he found them to know a good deal of the cant of criticism, and very seldom disposed to regard anything as meritorious which is not, at least, two hundred years old. Soon after his coming to town he was fortunate enough to secure the patronage of Stoddart, the celebrated pianoforte maker, who was married to a Wilkie, and ever afterwards proved his fast friend. He sat for his portrait, and ordered two pictures from him, and introduced him to the Earl of Mansfield, who commissioned him to paint a picture from his sketch of the "Village Politicians," taken from the "Ale caup commentators" in the ballad of "Will and Jeanie," by Macneill. Wilkie demanded fifteen guineas as the price of his work, but the earl told him to consult his friends about it. The picture was when finished exhibited at the Royal Academy, and excited such general admiration that he determined upon raising the price to thirty guineas. Lord Mansfield remonstrated, but the artist reminded him of his advice, and said that he was now acting upon it. Two other persons had offered him £100 for it.

The sketch which he had drawn while in the Academy at Edinburgh excited a sensation amongst the students, and called forth the warm commendations of Graham, his teacher; but it differed materially from the painting in many respects. It was a curious circumstance, as mentioned by Mr. Burnet, that although the pupils were at that time engaged in the study of the works of Westall, Morland, Julius Ibbotson, &c., many of the characters in Wilkie's sketch are taken from individuals frequently to be met with around Edinburgh. He was constantly dodging the peasantry, watching their attitudes and incidents in their daily life. He sometimes went out with some of his companions about dusk, and looked in through the windows of the cottages to see how the inmates grouped themselves around the fire, and in what way they were engaged.

He now gave up all idea of returning to Scotland, and determined upon remaining in London, as commissions came pouring in upon him in pleasing profusion. He soon after painted the "Blind Fiddler" for Sir George Beaumont. Of this picture we present our readers with an engraving; and we have already remarked upon the peculiarity that the hands of all the figures in it are taken from his own. Sir George lent him a very fine specimen of Teniers, which he kept before him the whole time he was engaged on the work, that he might acquire the sharpness of touch which distinguishes the French master. A great number of other pictures followed in rapid succession. "Alfred in the Neatherd's Cottage," for Mr. Davidson; "The Card Players," for the Duke of Gloucester; and "The Rent-day," for the Earl of Musgrave; "The Sick Lady," "The Jew's Harp," &c. The "Village Festival" was painted for Mr. Angerstein, for eight hundred guineas. In 1809 he was elected an associate of the Royal Academy, and a member in 1811. His own health was now beginning to decline rapidly from the closeness of his application. He therefore determined upon paying a visit to Scotland, where he remained from August until October. Upon his return to town he took apartments in Kensington. In May, 1812, he opened an exhibition of his pictures, twenty-nine in number, in Pall-mall. The undertaking extended his reputation, but caused him a loss of £414. His father died in December, and he then invited his mother and sister to come and live with him in London, in a house which he took in Kensington. In 1813 he painted "Blindman's Buff" for the Prince Regent. For the "Letter of Introduction" and the "Refusal," both small pictures, painted during this year, he received two hundred and fifty and three hundred guineas respectively.

He returned his income for the income tax in 1813 at £500 per annum, making the necessary reduction for his house.

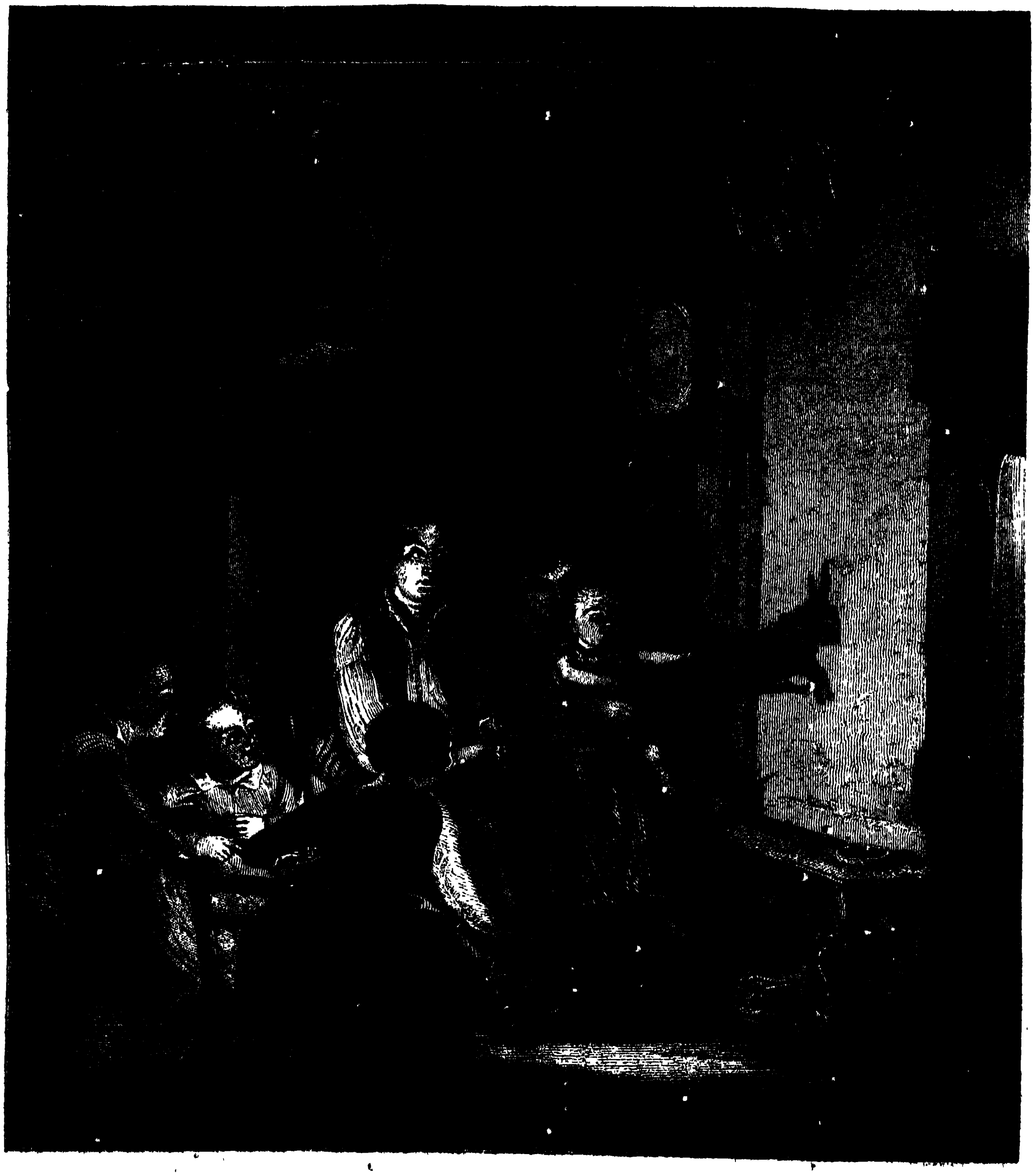
In 1814, during the short interval of peace, he went with his friend Mr. Haydon to Paris, for the purpose of studying the works of the great masters contained in the gallery of the Louvre. He paid particular attention to the Dutch and Flemish School, and stated that he was particularly struck with the works of Ostade and Terburg. Upon his return his style became somewhat altered, and was evidently founded upon that of the models which he had been examining. In the "Blind Fiddler," the "Rent Day," "The Letter of Introduction," and "The Chelsea Pensioners," there are evident traces of the precision and sharpness of Teniers and Metzu. In 1814 and 1815 he painted "Distraining for Rent," "The Pedlar," and the "Rabbit on the Wall." The first of these was purchased by the British Institution for 600 guineas. In 1816 he paid a visit to Holland, with Rembosh the engraver. In 1817 he went to Scotland, where he painted Sir W. Scott and his family. After his return to London the authorities at Cupar presented him with the freedom of the burgh. In this year he commenced his great work, the "Chelsea Pensioners," for the Duke of Wellington, for which he received 1,200 guineas. It is considered Wilkie's masterpiece, and the last of his really great pictures. It represents a group of Chelsea pensioners reading the *Gazette* of the battle of Waterloo, which had just been brought them by one of the Marquis of Anglesea's lancers. A short time previously he had painted "The Reading of the Will" for the late King of Bavaria, for which he received £447 10s. At His Majesty's death it was purchased by his successor for 12,000 florins, or £1,000 sterling.

In 1824 he lost his mother and one of his brothers; and his own health was beginning to decline so rapidly that he determined upon making a lengthened tour on the continent. Passing through France and Switzerland, he reached Italy, where he remained eight months engaged in the study of the great masters. In writing from Rome he gives the result of his observations, in a sentence which ought long ago to have put an end to the cant of criticism. "From Giotto," says he, "to Michael Angelo, expression and sentiment seem the first thing thought of, while those who followed seem to have allowed technicalities to get the better of them, simplicity giving way to intricacy; they seem to have painted more for the artist and connoisseur than for the untutored apprehensions of ordinary men."

Upon his leaving Italy he travelled into Germany, and visited Dresden, Toplitz, Carlsbad, Prague, and Vienna. At the last-mentioned place he had the very questionable honour of dining with Prince Metternich. Upon his return to Rome, the Scotch artists residing there entertained him at dinner, the Marquis of Hamilton presiding. His health now began to recover, and he forthwith recommenced his labours. He finished three pictures, and then set out on his way home. He crossed the South of France and entered Spain, arriving at Madrid in 1827. While here he painted the "Spanish Council of War," and the "Defence of Saragossa." In the summer he left Spain and arrived in Paris in June, 1828, and the same month returned to England. To the Exhibition of 1829 he sent eight pictures, four Italian and three Spanish, and a portrait of General Rellie. The three Spanish and two of the Italian were purchased by George IV. These pictures indicated a total alteration in his style, and those painted in Italy differed very materially from those painted in Spain. The former possess much greater serenity of composition than the others, but all have great breadth of colour and largeness of composition. In the earlier part of his career, while he made the Flemish and Dutch painters his models, most of the figures are too small for the interiors, as in the case of the "Blind Fiddler" and "Blindman's Buff;" but in his later works, after his visit to Italy they fill up the canvas, as in the cartoons of Raphael. He appears to have endeavoured to combine in his own pictures the softness of Corregio with the strength and serenity of Raphael. While at Madrid he paid most attention to the works of Velasquez and Murillo. The difference between his style before leaving England for the continent is clearly shown in his "Entry of George the Fourth into the Palace of Holyrood." This picture had been begun before he left home, and was finished after his return, and no one would imagine from looking at it that one artist had done the whole. The first part has all the minuteness of finish and detail of the Dutch school, while the latter is painted in the full flowing style of the Spanish artists. Titian and Corregio were his great authorities for colouring. In a letter to one of his friends in England he speaks of himself as having acquired "a bolder and more effective style," and that the result was "rapidity."

In 1830, after the death of Sir Thomas Lawrence, he was appointed Painter in Ordinary to His Majesty, and was also a candidate for the presidentship of the Royal Academy. He had, however, only one vote in his favour, the successful candidate being Sir M. A. Shee. In 1831 he sent to the exhibition portraits of Lady Lyndhurst and Lord Melville, and in 1832 he exhibited one of the most celebrated of his pictures, "John Knox preaching the Reformation in St. Andrews," painted for Sir Robert Peel for 1,200 guineas. This is thoroughly in the Spanish style, and has been ably engraved by Mr. Doo. After this he painted a number of portraits; amongst others those of the Duke of Wellington and Queen Adelaide. But his next great work was his "Columbus," which represented the great voyager submitting his chart to the Spanish authorities. It is the most highly coloured of all his works. Next came the "Peep-o'-day Boy," painted after a visit to Ireland; "Napoleon and the Pope in conference at Fontainebleau." In 1836 he was knighted by William IV.; and in 1837 appeared his "Mary Queen of Scots escaping from Loch Leven Castle," "The Empress Josephine and the Fortune teller," and "The Cotter's Saturday Night." In 1838 he painted "The Queen's First Council," and a portrait of O'Connell; and in 1839 "Sir David Baird discovering the body of Tippoo Saib after the storming of Seringapatam." This was purchased by Lady Baird for 1,500 guineas, and is considered the greatest of Wilkie's historical works. In 1840 he exhibited eight pictures, the most remarkable of which was "Benvenuto Cellini presenting a silver vase of his own workmanship to Pope Paul III."

In the autumn of the same year he set out on a tour to the east with Mr. Woodburn. He went by Holland and the Rhine to the south of Germany, and thence to Constantinople by the Danube. At Constantinople he was engaged to paint a portrait of the young sultan. His own description of the sitting may not prove uninteresting to our readers. "12th December.—Drove with Mr. Pisani to the winter palace of the sultan; were received inside the gate in a room where we had pipes; after waiting for some time, were conducted through a beautiful garden to the palace, changed shoes, and were ushered up a staircase to a most splendid and comfortable room. Here I put out the colours, easel, and placed chairs; and having the windows all but one darkened, stated that all was right. After a time his Imperial Majesty the sultan arrived; his style was simple and gentlemanly; and his reception of me very gracious. On taking his seat he addressed to me a few words, which Mr. Pisani interpreted to be that he was most happy at the request of a distinguished artist from England to sit for his portrait, considering doing so might show his consideration for the queen of Great Britain, who was so powerful an ally of Turkey. I bowed. Then being told by his majesty to be seated, I began the head. He came and looked at it several times. I understood he remarked I was making it too little; then asked if it was to be standing. I assured him no, but sitting on the throne as sultan receiving people presented. At another time he said, might not the uniform with the epaulettes be seen. But I urged that for this picture the cloak of the sultan would be better, and that the hands and sword would be seen. This seemed to please him, and I went on; and I think he thought it like and pleasing.'"



THE RABBIT ON THE WALL. FROM A PAINTING BY SIR D. WILKIE.

In January Wilkie and his friend left Constantinople, going by way of Smyrna and Beyrout to Jerusalem. On ascending an eminence on the road from Jaffa, the first sight of the Holy City burst upon them. Wilkie was in raptures.—"We saw, and oh, what a sight!" says he, "the splendid walled city of Jerusalem. This struck me as unlike all other cities; it recalled the imaginations of Nicolas Poussin—a city not for every day, not for the present, but for all time." On the 17th of April they left Jerusalem for Jaffa, and arrived at Alexandria on the 22nd. Here Sir David complained of illness, and stated that he had not been enjoying good health for three months previously. He however commenced a portrait of Mehemet Ali, which the latter wished to keep himself, and sat for two hours and a half the first sitting. On the 21st of May he embarked on board the *Oriental* for England. On the 26th he arrived off Malta, where he imprudently eat a large quantity of fruit and iced lemonade, and on the first of June whilst off Gibraltar, he died, and on the same evening his body was committed to the deep, the burial service being read over him by the Rev. James Vaughan, Rector of Wroxall. And there he sleeps

———"A calm and peaceful sleep
With the wild waves dashing o'er him."

It must for ever be a subject of regret that the mortal remains of one of the purest and most potent spirits that England ever nursed could not have been restored to the bosom of their mother earth. But the country which his genius glorified can never forget him. At a meeting of his friends, at which Sir Robert Peel presided in August, 1841, a subscription was commenced to raise a monument to his memory, and Mr. Joseph was commissioned to execute a statue to be erected in the inner hall of the National Gallery, the scene of so many of his triumphs. The sale of his effects, among which were many unfinished works, realised many thousand pounds. An unfinished sketch of "The School" was sold for £750.

Sir David Wilkie was tall, of sandy complexion, and had sharp eyes. His manners were mild and gentlemanly. He retained through life an ardent attachment to his native land, and though professedly belonging to no party in politics, he displayed the exaggerated respect for mere wealth and station which characterises many parvenus, when not possessed of great strength of mind. There might have been considerable change in his style had he lived to return from the East; but what he has achieved is more than sufficient to place him in the first place amongst the artists of the present age; and there is every probability that lapse of time will only increase men's respect for his genius, and their admiration of his works.

THE BLIND FIDDLER. FROM A PAINTING BY SIR D. WILKIE.

DOMESTIC ECONOMY IN BOMBAY.

The way in which our Anglo-Indian friends contrive to pass their lives in spite of a burning sun and other disagreeables incidental to a tropical climate, has been pleasantly told in a volume lately published, entitled "Life in Bombay." As soon as the writer arrived at the island which, with the country round, forms one of the three presidencies of British India, he was doomed to be disappointed. With his mind filled with English notions of oriental pomp, and his imagination excited by the tales he had heard on shipboard, of the magnificence of Indian houses in an Indian climate, it is easy to conceive his amazement when he stepped from his carriage into the doorway of a "long one-storied building with an over-hanging thatched roof, and looking for all the world like a comfortable cow-house!" In speechless dismay he listened to his companions' assurance that this was actually his destination and future home. But, however much he might have felt disappointed at the sight of the exterior of the building, his spirits were revived when he came to make acquaintance with the inside. The similarity to the cow-house was only outside; and when he made his way into a "large and elegant drawing-room, supported upon pillars of faultless proportions, and furnished with every modern luxury," he was fain to acknowledge that he formed too hasty a decision. However, we had better let the author speak for himself.—

"A large screen of red silk divided this apartment from a spacious dining-room; and the completeness of the remainder of the house bore ample testimony that neither comfort nor appearance is neglected by the Anglo-Indians in the internal arrangements of their domiciles, however slightly they may consider the external.

"An entire suite of apartments is appropriated to the use of each individual, consisting of a bed-room, dressing-room, and bath-room; and one or all of these usually open upon the verandah which surrounds the house, and which is considered indispensable in the construction of even the poorest abode; not only as affording protection from the intolerable glare of the sun during the day, but as presenting an agreeable family resort, when the refreshing evening breeze tempts every one to exchange the heat and lights of the drawing-room for a delightful *réunion* in the open air.

"Here, too, conversation flows on more unrestrainedly than beneath the blaze of the numerous lamps, rendered necessary by the extensive dimensions of a Bombay room; and we have often remarked the influence of this witching hour in imparting confidence to the timid and unsealing the lips of the taciturn. But its effect upon one individual of our acquaintance was particularly conspicuous, and upon more than one occasion it has been our privilege to listen in amazement to the outpourings of a superior, though usually considered, reserved mind; as with rapid eloquence he bore all before him, and made his almost entranced audience forget that this was the man they had hitherto shunned for his apparently unconquerable silence!

"It must however be premised, that the above description of a Bombay house refers distinctively to the bungalow, or one-storied building, and is not to be considered as a criterion of the general aspect of English residences, which are usually lofty and stately-looking mansions, with façades adorned with spacious porticos supported on pillars of sufficient width to admit two carriages abreast, thus insuring to the occupants a sheltered mode of ingress and egress, equally essential during the heat of the fair season and the damp of the monsoon.

"The internal arrangement of this description of house is much the same as in England; the ground-floor containing the dining and breakfast rooms, library, &c., and often one or two suites of apartments appropriated as guest's chambers, and which are seldom untenanted for a single day, in a place where hospitality is decidedly a leading characteristic.

"The staircases are generally wide and handsome, conducting to the reception and family rooms; and not unfrequently, a charming withdrawing-room is found on the flat top of the porch by surrounding it with a balustrade, which also serves as a support to a light veranda-like roof.

Though the houses in Bombay are built with all due regard to comfort, and are admirably adapted to the climate, great care being always taken to insure a free admission of air into every compartment; yet, some time must elapse before the stranger can divest himself of the idea that he is always in public; and vainly he sighs for the unassailable retirement which the announcement of "going to one's own room" always secures at home. The cause of this apparent publicity is evident. To promote a thorough circulation of air, the number of doors and windows is necessarily great; and as even the partition walls are generally constructed of venetians, moveable to the slightest touch, it can be easily understood that the first impression produced upon the mind of a *nouvel arrivé*, as he enters an Indian bedroom, is, that he is to be the occupant of a magnified birdcage.

"The daily use of the bath can scarcely be classed as a luxury; it becomes an absolute necessary, not only of cleanliness, but of health, in a climate where heat and moisture alternately predominates; and perspiration is consequently so profuse as to require frequent ablutions to maintain an unimpeded action to the pores of the skin. But here are none of the mechanical contrivances for abridging labour, such as the poorest bath-room in England would possess; and even our sturdy housemaids at home would shudder to hear that the large tubs are actually filled by hand! the warm water being conveyed in chatties (or earthen vessels), which never contain more than from one to two gallons! It is, therefore, the entire business of one man to preside over this branch of household work, and indeed where the members of a family are numerous, a second becomes often necessary. This gentleman is termed the bheesty, or panee walla, and he is always to be seen accompanied by a bullock laden with skins, containing the supply of cold water which is obtained from some neighbouring tank.

"Although the number of servants considered indispensable to a moderately-constituted Bombay establishment is not nearly so great as in Calcutta or Madras, it is considerably larger than people of corresponding means would ever dream of maintaining in England, where, not only the terrors of taxation, but the alarming appetites of the inmates of a servants' hall, offer a formidable impediment to any superfluity of male domestics. Here, we neither provide bed nor board; for the former a piece of matting thrown upon the ground amply suffices, and upon this the most respectable servant contentedly stretches himself, swathed like an Egyptian mummy, from head to foot, in a white cloth during the warm weather, or in a comblee (coarse blanket) when the cold season makes its appearance. The variety of religions and castes amongst our domestics, is the surest guarantee to us of security from the annoyances of providing food. Neither Hindoos, Mussulmans, nor Parsees, would dare to partake of a morsel in the society, or even sight of each other; and so strictly is this separation enforced by their respective priests, that it is imperative even the cooking of their meals should be performed by people of their own community.

"Thus it is that our cooks are invariably Portuguese, who, being Christians, are not troubled with scruples regarding the preparation, or, indeed, appropriation, of their master's repast's; and though ostensibly providing their own meat and drink, contrive to live luxuriously and gratuitously on the abundant remnants of an Indian table. These men often attain to great excellence in their profession; a skilful artiste is sure of commanding a good place and high wages; and thus both their cupidity and ambition are exercised to produce dishes, which the most refined epicures fresh from the *cuisines* of Paris and London need not despise. These people generally belong to the Portuguese settlement of Goa, whence they migrate in considerable numbers to Bombay, always unaccompanied by their wives and children, for whose provision they cheerfully doom themselves to voluntary exile, until the realisation of a sufficient sum will enable them to indulge in a six-months' visit to their family and friends at home. The dirzees, or household tailors, are also generally of this class; as, from their greater approximation in dress and habits to ourselves, it is naturally easier for them to enter into all the mysteries of fashion and fit, than it could possibly be to the Hindoos or Mussulmans.

"There is, however, a superior class of Portuguese in Bombay, who occupy with ability the posts of Purvoes, or clerks, in the public or mercantile offices, and are of course considered as aristocrats among their own people. But with few exceptions, these men, whose forefathers were once the lordly possessors of the soil, are in a position of absolute servitude in the present day; and their consequent deterioration, both in a moral and physical point of view, is melancholy to contemplate.

"Their habits are proverbially intemperate, whilst, strange to say, either from the effects of climate, exclusive intermarriage among themselves, or habitual intemperance, the complexion of the Indo-Portuguese is now conspicuously darker than that of the aboriginal natives of Asia.

"But all this time, we have proceeded no farther in the formation of our establishment than the Bheesty, cook, and Dirzee department; and lest we should be tempted to another digression, we will hasten at once to enumerate the several functionaries considered indispensable to the correct arrangement of a *maison bien montée* in Bombay.

"And first in rank, and in pay, comes the butler, or house steward, as he would be more properly denominated; whose business consists in a general superintendence of the other domestics, in purchasing all articles for household consumption, and cheating his master to the extent of his ability.

"In this latter qualification, indeed, few are deficient, their talents for appropriation being usually as capacious, as their insatiability is rapacious.

"Then follow the table servants, either two, three, or four in number, according to the size and circumstances of the family, and partially corresponding to our English footmen in their duties of attendance at table, cleaning plate, &c. To these are subordinate, the Musaul, or lamp-lighter, the Aamauls, whose duty it is to keep the house and furniture in cleanliness and order, and a Bobajee, or cook, with his mate, answering to our kitchen-maid at home. Then in the stable department there must be a coachman to every carriage, and a Gora-walla, or groom for every horse, and, according to the extent of the garden, from one to six Malleys, or gardeners.

"We have not yet touched upon the female department, though forming the most important and influential branch of the establishment. The Ayah is of course exclusively appropriated to the service of the "Madam Sahib," and, when treated with kindness and consideration, generally becomes faithfully attached to her mistress, and quite devoted in her love for the children, or *Baba* *tagne.* These have also their separate attendants, either in the form of an Amah, or wet nurse, an Ayah or a child's boy, as the men-servants who wait upon the children are designated, let their age be ever so venerable.

"We must subjoin to this already long catalogue, the Dhobee, or washerman, with his assistants; and Peons *ad libitum*, whose laborious duties consist in sitting all day under the porch to receive, and hand in, the cards of visitors, notes, messages, &c. Altogether, the number of servants in a handsomely conducted English house, generally amounts to between twenty and thirty; and of these, the greater part, with their families, reside within the boundaries of their master's estate.

"The expense of such an establishment, though not so great as a similar one in England would be, is still considerable; certainly it can never be calculated under £200, and more frequently it amounts to £300, or even £400 per annum. But here, at least, the expense ends; as we are spared the enormous outlay and endless discomfort, entailed upon the English housekeeper, by the necessity of attending to the provision and accommodation of their never-satisfied dependants."

CARLSBAD. WATERING PLACE IN BOHEMIA.

Imagine a town built around a caldron of boiling water; and you will have some idea of Carlsbad. In the midst of the great masses of granite which are scattered over the surface of the surrounding country, the valley of Teplis seems to be a great fissure, as the protuberances and indentations on each side correspond exactly. This was doubtless caused by some great volcanic eruption in former times, as there are evident traces of its action upon every side. The lower part of the fissure appears to be filled with enormous rocks of granite, piled one upon the other in the wildest confusion, and leaving interstices between them so large as to resemble immense caverns. The meadows in the valley cover all this scene of disorder like great carpets; the waters rush down into the void, and as the abyss doubtless extends to the vicinity of the regions of eternal heat, they are there warmed, electrified, charged with carbonic acid, and various mineral substances, and are then sent up again to the surface to cure invalids. But on its arrival the gas disengages itself, and the calcareous matter which had been held in solution, settles in incrustations upon everything around. At first these incrustations were fixed upon the sides of the fissure only, but becoming thicker by degrees they have at last extended across the top, and vary in thickness from a yard and a half to two yards. Upon this a part of the town is actually built.

THE SPRUDEL SPRING.

This covering is of course kept heated by the high temperature of the waters underneath, and consequently let the winter be ever so severe they never have any snow at Carlsbad, because it melts immediately on falling, and flows into the river, which for the same reason never becomes frozen. As the incrustation is by no means a very strong substance, the water and gases confined beneath it sometimes burst it, and make their way through, and thus make a new spring, and a great column of vapour. In some places where the incrustation is exposed to violence of any sort, as to the action of the current of the river, they have been obliged to strengthen it, like an old broken basin, with pieces and fastenings. The pieces are slabs of granite and building joists, held together by bars of iron. "Large square blocks of stone," says a Carlsbad doctor, in a work upon the waters, "are placed above the spring, to serve as a defence against the great blocks of ice and trunks of trees which sometimes come floating down the stream, and in case of an inundation or a thaw, would beat down the crust and destroy the equilibrium necessary to the regularity of the jet of water." And to prevent all ruptures in the neighbourhood of any of the springs, by the passage becoming choked up by new incrustations, they sound them with a fathom line four times a year. By careful attention of this kind the mineral wells have come to possess a regularity and system, so to speak, which, if left to themselves, they could never have. In 1711 and 1727, very large openings appeared on various parts of the surface sufficient to cause considerable alarm, and it was then determined to dig more deeply than had ever been done before, and it is to this that the little knowledge which people possess of the internal formation of the crater or caldron is due. There is not merely a single crust, or a single cavity, but a great number of cavities separated from each other by irregular incrustations, like the vaulted roofs of a number of cellars placed one above the other. After the sounding line had passed through a great number of these caves, the explorers found themselves over an abyss of boiling water, the bottom of which they could not fathom, and which appeared to extend in the direction of the valley. The water made such a terrible noise, and foamed up with such fury, that they were at length obliged to make a hasty retreat.

There are eight springs to which invalids principally resort, but there are many others equally good in a medical point of view. These are all but jets from the same reservoir, differing solely in temperature, and the quantity of mineral substances which they contain, according as they have had to pass a greater or less distance through the soil, or have mixed more or less with rain-water. The principal well is called *Sprudel;* it is situated on the right bank of the Teplis, near the middle of the town. Its temperature is about 109 deg. Fahrenheit. Eggs are boiled in it, and it is made subservient to all sorts of culinary purposes; so that below the spring, and along the whole of the stream which flows from it into the river, an army of cooks may be seen every day in the season, plucking fowl, pulling the hair off sucking pigs, and getting eggs and vegetables ready. This scene, though not very poetical, is nevertheless interesting, as furnishing a remarkable instance of the variety of uses to which the waters may be applied, healing the sick, and cooking food for the healthy.

This spring appears to rise from the earth very calmly and soberly, but suddenly leaps up in a furious manner, giving out clouds of vapour that fill the apartment which has been built around it. The jet is not regular; sometimes it rises only about a yard, or a yard and a half in height; then suddenly springs up three or four yards, almost to the roof of the building, and then falls back with a great noise. From eighteen to twenty ebullitions of this sort have been counted in the course of a minute. Many might imagine that they are caused by the boiling of the water, but such is not the case. It is all owing to the escape of the carbonic acid. This gas accumulates in the upper part of the cavity, and presses with great violence upon the surface of the water and upon the crust. The more the pressure increases, the more violently is the water forced towards the aperture, and when once it has reached it, it of course bursts out with terrific violence. The noise and ebullition is increased by the carbonic acid endeavouring to escape at the same time.

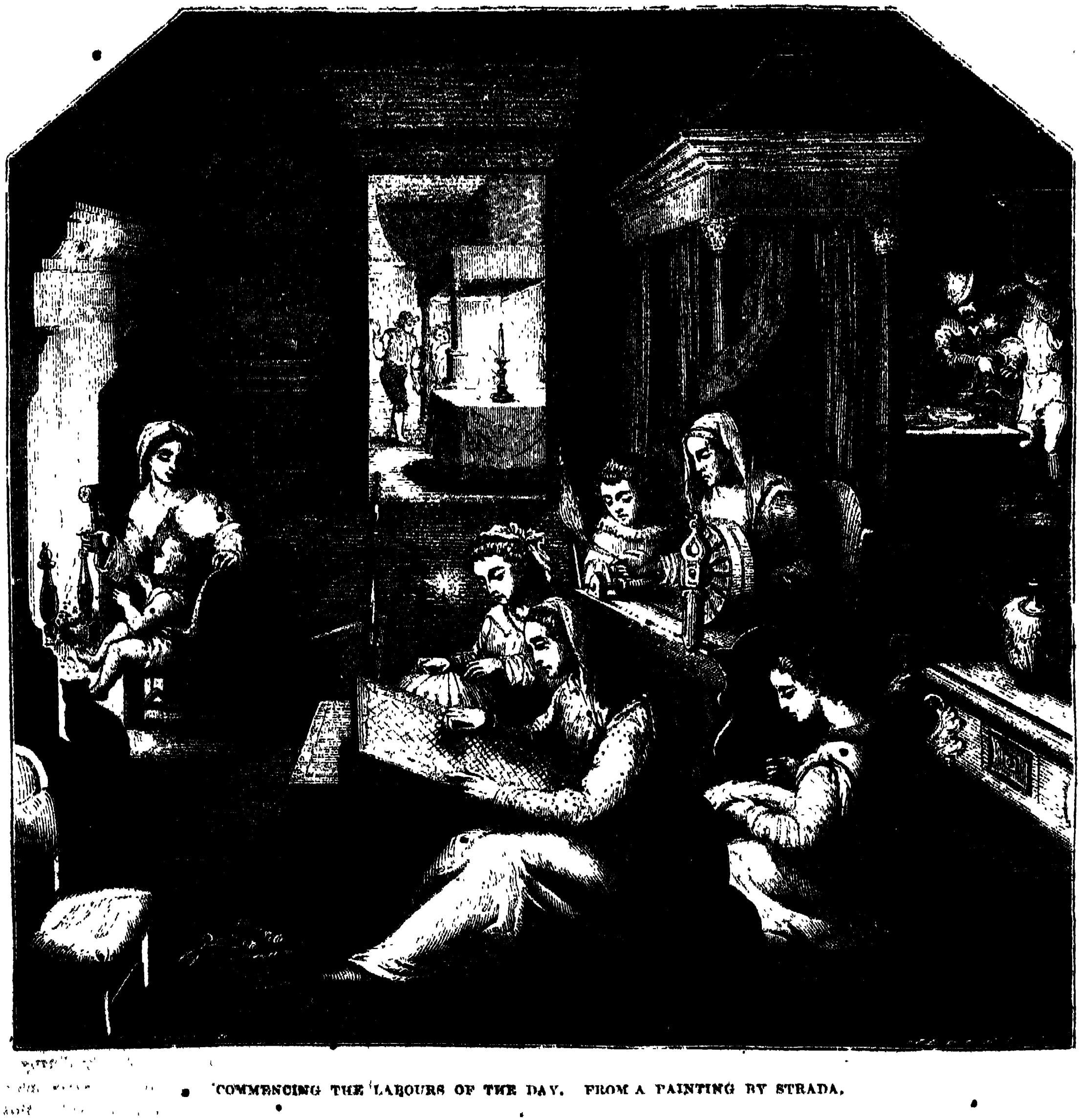
CARLSBAD.

M. Berzelius, the Swedish chemist, of whom we lately gave a portrait and biography, has analysed the Carlsbad waters, and has found them to contain five-and-a-half parts of salt in every hundred. This is a very considerable proportion, and gives it a very strong savour, somewhat like that of chicken broth. Sulphate and carbonate of soda enter into its composition very largely—the former in the proportion of 2¼ to 100. But no use whatever is made of all this riches. It has been calculated that more than six pounds of sulphate of soda, and more than three pounds of carbonate of soda, fall into the river every minute; and as these salts are not only useful in a medical point of view, but have a high commercial value in consequence of their being extensively employed in various branches of manufacturing industry, it may be easily seen that nothing but great blindness and neglect on the part of the inhabitants of the town could induce them to neglect so important a source of revenue. More than nine tons of sulphate of soda, and about half this quantity of carbonate of soda, go to waste every year, which, at the selling price of these articles, would realise not less than £20,000.

It is said that the Sprudel Well was discovered in the middle of the fourteenth century, by Charles IV., emperor of Germany and king of Bohemia. He was out hunting in the forests in the neighbourhood, and the stag having crossed the river exactly opposite the boiling spring, the dogs followed close behind, and, in the ardour of the chase, fell into it. The emperor, hearing their plaintive howls, pierced his way through the thicket, and thus discovered the well. His physician examined the water, pronounced it medicinal, and recommended it to him for the cure of some wounds from which he was then suffering. He was so pleased with the result, that he built a castle near the spot, and hence the name of Carls-bad (Charles's bath). But the truth of every part of this story, except the last, is open to grave doubts. It is certain that the emperor interested himself in the success of the baths, and conferred upon the place some important privileges. He resided there during part of the years 1370 and 1376, and then bestowed his name upon it. It is very probable that the University of Prague, meeting at such a short distance from the springs, did not fail to examine them, and its recommendation would, of course, go far to enhance the reputation which they had already acquired. But their discovery must certainly have taken place at a period far beyond that assigned to it by the popular tradition. A document of doubtful authenticity asserts that the emperor used the waters for the healing of wounds which he had received at the famous battle of Cressy, where he lost his father, John the Blind; but it is now very clearly established that he was not present in the battle at all, and neither in his autobiography, nor in any contemporary manuscript, is any mention made of his having resorted to the springs. In very remote times there was a castle on a hill in the neighbourhood, the ruins of which have long ago disappeared, which was called *Hrad Wary*, or the "Castle of the Hot Spring." Neither the inhabitants of this castle, nor those of the town of Elben, only two leagues distant, and where the Three Kings often fixed their residence, nor the wood-cutters and hunters who frequented the forests could have been ignorant of the existence of so extraordinary a phenomenon. Besides the heat of the waters which prevents the river from freezing, and that of the ground which prevents the snow from lying, must have excited their curiosity to learn the cause, even if the thickets had hidden the jet from the view. The name Teplis is drawn from the heat of the waters, and this is found in historical documents bearing date some centuries previous to Charles IV.

The town is pretty, neat, and salubrious, and is almost entirely composed of lodging-houses for visitors. The population is of course every year increasing. In 1834, it numbered 3,287, exclusive of visitors, who made a total of 10,000.

MORNING.



COMMENCING THE LABOURS OF THE DAY. FROM A PAINTING BY STRADA.

JOHN STRADA, or Stradan, was born at Bruges in 1536, of an illustrious but reduced family, and in that city studied the first principles of painting under his father, who was an artist of eminence. To complete his knowledge, he paid a visit to Italy when very young, and for some time found employment at Florence in the palace of the duke. He proceeded thence to Rome, where he studied the antique, with the works of Raphael and Buonarotti. Before he quitted Rome, he painted in conjunction with Daniel da Volterra, and Francesco Salviati some of the ornaments of the palace of the Belvidere. By this he acquired some of the manner of Salviati, which he ever afterwards retained. From Rome he was invited to Naples by Don John of Austria, to paint some of his military achievements, and this he performed in a manner that gave great satisfaction to his patron. He then again returned to Florence, and was for some time employed in decorating the palace and the churches. Some of his greatest works, and those upon which his reputation rests, may still be seen in that city. In the church of Annunziata is a painting of the "Crucifixion," which is a grand composition, consisting of a number of figures rather larger than life. In Santa Croce is a fine piece of the "Ascension;" in Santa Maria Nuova, is the "Baptism of Christ;" and in the chapel of the Palazzo Pitti are two altar-pictures, one of the "Nativity," and the other of the "Wise Men." Besides the subjects taken from sacred history he delighted to paint animals, huntings of the wild boar, and battles, all of which he executed in a noble style, with a steady hand and firm pencil. Notwithstanding his long residence in Italy, he always retained much of the Flemish manner. He had, however, a good taste of design and an agreeable tone of colouring. Strada was a member of the academy at Florence, where he died in 1604.

Our engraving is taken from one of the sixteenth century, reproducing one of the works of this master, called *Morning*. Although it has not the delicacy of finish which may be seen in engravings of the present day, it has a great deal of truth and character. The family are all up, and though, as the burning candles seem to indicate, it is not yet day, they have resumed their various occupations, with the exception of an obstinate sleeper in the adjoining apartment, whom a servant is vainly endeavouring to arouse. The grandmother is occupied in directing the movements of an oldfashioned spinning-wheel, the mechanism of which seems to interest the child at her side. The young mother and her sisters, clothed with modest elegance, seated on cushions, are engaged in some piece of embroidery, and a servant at the fireplace is amusing an infant with a rattle. The master of the house appears to be taking a snake out of some sort of a vase, whilst the servant gives him light with a lamp. The family appears to be that of a wealthy burgher of the olden time. The abundance, good taste, and even luxury which appear in their dress and in the furniture give the whole scene a very pleasing cast. Labour and early rising seem to them rather a virtuous habit, than, as now, a rigorous necessity.

A SUMMER EVENING WALK IN THE VILLA RICARDI, AT NAPLES.

How can I describe the beauties and enchantments that surround me? Read all the books of travels, read the glowing descriptions of poets, get by heart the hackneyed and enthusiastic terms that are distributed through every guide-book. raise your imagination to fairy dreams! still you can have but a poor idea of all that is lovely in nature in Italy.

Travellers falsely suppose that winter is the time to be in Italy; and my fidgetty country-people, at the approach of summer, put themselves into their comfortable carriages to leave the country with the crowd who seek gaiety and amusement in some great northern capital. The charms of summer are to them as perfectly unknown, as all but the name of summer is to the inhabitant of the north of Europe.

To a mind at ease, to a person at peace with himself, to one capable of home pleasures, or of literary pursuits, or the love of nature, this country has a thousand untried and enticing charms. The mornings are calm and peaceful, and the evenings so lovely, words are wanting to describe them, and hues to paint them. When the deep azure of the calm sea is covered with boats and vessels of every size, and belonging to every country, from the stately man of war to the graceful felucca, and the little boat covered with striped awning that skims across the bay. The sun gradually sinking behind the island of Ischia, and Procida, reflects a thousand hues upon Capri, Vesuvius, and the opposite shore of Sorrento. Each white house is to be discovered half hid in its orange-grove; each convent, each cassino is easily traced, and higher up upon the hills are seen, the lilac, purple, and orange tints of a summer sunset.

Naples in its architecture is not a fine town, but its situation round the bay is so beautiful that one is not disposed to criticise that defect. The domes of its numerous churches, the two castles, both so advantageously placed, St. Elmo on the height commanding the town, the Castel' Ovo, stretched out into the sea, and numerous white palazzos with their terraced gardens; and, upon the mountain of St. Elmo, overhanging vineyards.

> "The vine on high, the willow tree below,
> Mixed in one mighty scene with varied beauty glow."

I was contemplating this scene, this brilliant scene of magnificence, one evening in the month of July, from a garden near St. Elmo. The Prince of C——, a Neapolitan who accompanied us, did not seem to partake of my enthusiasm. He reminded me of Mayer, who looking at the same view from the garden of the Chartreuse, now San Martino, turned to the monk who was showing them the monastery, in a state of enchantment, exclaiming with German enthusiasm, "Painters and poets, where are your colours, where are your words to describe this scene!" The monk answered very quietly, "*Noi altri, non sentiamo niente.*" The Neapolitans do not either see or feel the beauties of nature; it is for us children of the north to see and feel acutely,—painfully; but for those brought up in these sunny scenes of grandeur, the magnificence of nature rather bores them than gives them any feelings of delight.

Besides the magnificence of the views of the bay, the garden where we now were, was ornamented with every shrub, from the stupendous palm-tree to the delicate cassia. Flowers of every hue and of every odour, were trained upon bowers and charmilles or hung in festoons from tree to tree. The scarlet pomegranate, the white gardenia, all the various sorts of Cape jasmine, roses in profusion, geraniums of enormous size and growth, the passion flower bearing at once both fruit and flower. Altogether this luxury of decoration reminded me of the poetry and scenes of Lalla Rookh. An Englishman who was with us, and had lived much at Rome, differed from me in his admiration of the scene before us. "It blends not with my memory of the past," he said, "as the scenery does around Rome; it is very brilliant, I allow, but

> "There's a beauty for ever, unchangingly bright,
> Like the long sunny lapse of a summer's day-light,
> Shining on—shining on, by no shadow made tender,
> Till love falls asleep in his sameness of splendour."

This is not the beauty that speaks to my feelings. I like a countenance in country, as I do in people; and when I look at the horizon round Rome, a desolation like that of Tyre and Babylon, when I see the melancholy of the Campagna, with its long line of ruined aqueducts, all interest me more than this glow of prosperity. Those barren dark lands, with here and there patches of cultivation thinly scattered, the smoke rising as beacons of malaria near the miserable cabins, the lovely shape of the mountains that encircle those plains, and the aërial tints which hang about their heights, the ruined temples and tombs, the remains of fallen grandeur, all conspire more than these scenes to attach the imagination; and attached it does become to Rome as to a dear friend! that barren Campagna inspires more to poets and painters than such a brilliant scene as this we look on; there is a something in living upon the past that reconciles man to himself, consoles him under all deep feeling, and makes him think of death ever with tranquillity; a feeling of calm repose, of religious pensiveness, takes possession of the soul, even in the residence of modern Rome. Modern, as well as ancient poets, have sung the charms of its Campagna. Madame de Staël has called it 'La patrie des Tombeaux,' and Claude saw and painted the soft tints of Roman scenery, in preference to all others. Would the present scene we look at minister to a mind diseased? Certainly not! The contrast of its brilliancy, and the gloom of a desponding spirit, would increase all mental misery? This is a scene for the gay, the happy, and the prosperous." I answered by the words of a song—

> "Nothing is lost on him who sees
> With an eye feeling gave,
> For him there's a story in every breeze,
> And a picture in every wave."

* * * * *

‘While thus discoursing, we left the view of the Bay of Naples, and had taken a shady walk under acacias, that led a considerable way down into the valley in the opposite direction. Over our heads were vines festooned from tree to tree, that threw a soft shade upon various coloured oleanders that grew here in profusion; and round each acacia grew hydrangeas of that dear and tender blue, so beautiful and so refreshing to behold. This walk at length opened to a glade where there were some stone pines of great size and beauty: the rose hung about their branches in festoons, and grew on them, as, in England, ivy clings to the oak-tree; and near these trees the Indian fig and the enormous aloe plant, reminded us from their luxuriant growth how near we now were to the shores and climate of Africa. Nothing is finer than the effect of these savage plants breaking the monotony of a garden, and carrying the ideas to more distant regions. Here we rested; and from between the trees we had a distant view of the blue ocean and the purple mountains of the island of Ischia. An old tower, picturesquely situated, helps to set off this lovely view. The sun was sinking upon the long line of plain, once the Elysian fields. It was there that the poets supposed the souls of the good enjoyed eternal happiness. There was anciently the burial-place for the people of Misenium; and their being obliged to convey the bodies across the dead sea, gave rise to the poetical fiction of Charon and his attributes. On the banks of this water were ranges of tombs, now opened by time to daylight. I could not help remarking to my Roman friend, that here was a country and a view as rich in recollections as any Rome could boast. On these shores we behold the ruins of seven cities which once embellished them. Beyond the dead sea is the Misenium of old, where Rome once held her fleets; and the island of Procida, a scion of ancient Greece, having been peopled by a Grecian colony from Cuma; and further on is Ischia, an extinct volcano of uncertain date. Returning back are the villages of Baja and Bauli, where ruins of temples and baths are freely scattered amongst the vines and fig-trees that are overtopped by the castle of Baja, built in modern days by Naples' famous viceroy, Pietro de Toledo, in the time of the Emperor Charles V. Here emperors, poets, orators, and beauties had their palaces and their villas. The Cento Camerella, the Piscina Mirabilis, the baths of Nero, the tomb of Agrippina, and the temples of Venus and Diana, are all on that shore. Further back lies Torre de Patrice, the sepulchre of Scipio and Cuma, and the cave of the Sibyl. Nearer to us and to Puzzuoli are the lake Avernus, with its ruined temple, and the Lucrine Lake, so often the theme of the ancient poets. Two extinct volcanos are in its neighbourhood—the Solfatara and Monte Nuova, now a mountain of ashes, that sprung up on the site of the beautiful town of Tripugola, that lies buried within it. This eruption and earthquake, in 1538, nearly destroyed all that remained of the great city of Puzzuoli; and all that war or Spanish tyranny had previously spared. At Puzzuoli are great remains of antiquity. Its range of tombs that formed the entrance into the town (called Colombaria), the views of the bridge of Caligula, now known by antiquaries as the ancient Mole of Puzzuoli; the Temple of Jupiter and the amphitheatre, the scene of the barbarities of Nero, and of the martyrdom of Naples' favourite saint, St. Januarius—all are as interesting to the antiquary, as they are picturesque to the artist. Here was that country where nature, poetry, and history rival each other in interest—a country which no one can look at but with enthusiasm—a country of extinct volcanos—the country described by Pliny and Virgil, and the country of the gods themselves, when their presence was sought by their worshippers in temples; all is brought to the eye of the looker-on.

The sun sank gradually into the west, behind the purple peak of Ischia's Isle, while the crimson and orange streak that stained the sky, contrasted with the dark mountain opposite of the Camaldoli stands. The revolution of war had for a time dispersed the fathers, but it is now restored, and inhabited by monks, whose vows are to pray for the peace of souls of others. From an immense height they look from their airy cells into the town of Naples, and it is said can hear the din of the multitudes in its streets; Naples—the town in Europe where there is the least religion, though here and there superstition and bigotry remind one of its absence. The fathers possess the vineyard and gardens round the convent. The sun sank gradually, and as we watched it a thoughtful mood had crept on all the party, and we lingered long. In such hours as these the mind turns to its strongest feelings; our sigh turns inward—

———— "Man forgets
His stern ambition and his worldly cares,
And woman loathes the pretty vanities
That mar her nature's beauty."

Sometimes one sad and engrossing idea gets possession of us, and then the present, all, everything vanishes, but *one* fatal remembrance. We retraced our steps by a walk which led to the house where the owner of this paradise resides, a man who is almost a solitary instance in this country of the south of a person who prefers country pursuits, planting, a garden, and literature, to the ambition of public life, the noise of a town, or the amusements of San Carlo—a rare instance in Italy of true philosophy. As we walked through the dark paths of the garden, the sky, of a clear blue, drew some observation from its extreme beauty; spotted with bright golden stars, it looked so clear, and excited such a general impulse of admiration, that one of our party, recollecting the magnificent passage in Coleridge's Wallenstein, repeated it.

The sound of cheerful voices, for we had got near the house, made us know that we had deviated from the path which led to the high ground that overlooks the Bay of Naples. No evening in the north of Europe, however fine, however bright, can give an idea of an Italian evening. There, indeed, through the soft, clear air, one might read one's fortunes in the stars.

When we reached the spot from which we had first set out, just enough twilight remained to make the dark masses of mountain and ocean visible, and here and there lights glimmered in the town of Naples; and from the boats of the *Lanciatori*, scattered over the bay, a clear young English voice was heard near, singing that song of Milton's, so suited to the place and to the evening —

"O'er the smooth and enamel'd green,
Where no print of step hath been,
Follow me as I sing
And touch the warbled string.
Under the shady roof
Of branching elm, star proof,
    Follow me.
I will bring you where she sits,
Clad in splendour as befits
    Her deity;
Such a sumptuous queen,
Is rarely to be seen."

We stood examining these objects with the interest that things visible, and not distinctly so, give, when the moon rose as if out of Vesuvius—rose in all its glory, like an illuminated globe, from the crater of the mountain. What a magnificent sight! What a glorious scene! we all exclaimed, as it gradually rose, and its pale light fell on the deep blue ocean. As each object came into view, we lingered on and on, not able to tear ourselves away from this lovely scene.—*Sketch Book of the South.*

ORIENTAL ORIGIN OF HERALDIC TERMS.

The names and signs employed in Heraldry are for the most part derived from the Moors, and from the tournaments of the age of chivalry. The names of the colours used are Arabian. Their etymology has been traced by a French writer in a work entitled, "*Monde Primitif.*"

Gules (red), from *Gluel*, rose, red; thus they say, *Ghulistan*, empire of the roses.

Sable (black), from *Zebel*, or *Zibel*, black.

Azure (blue), from *Azul*, colour of the sky.

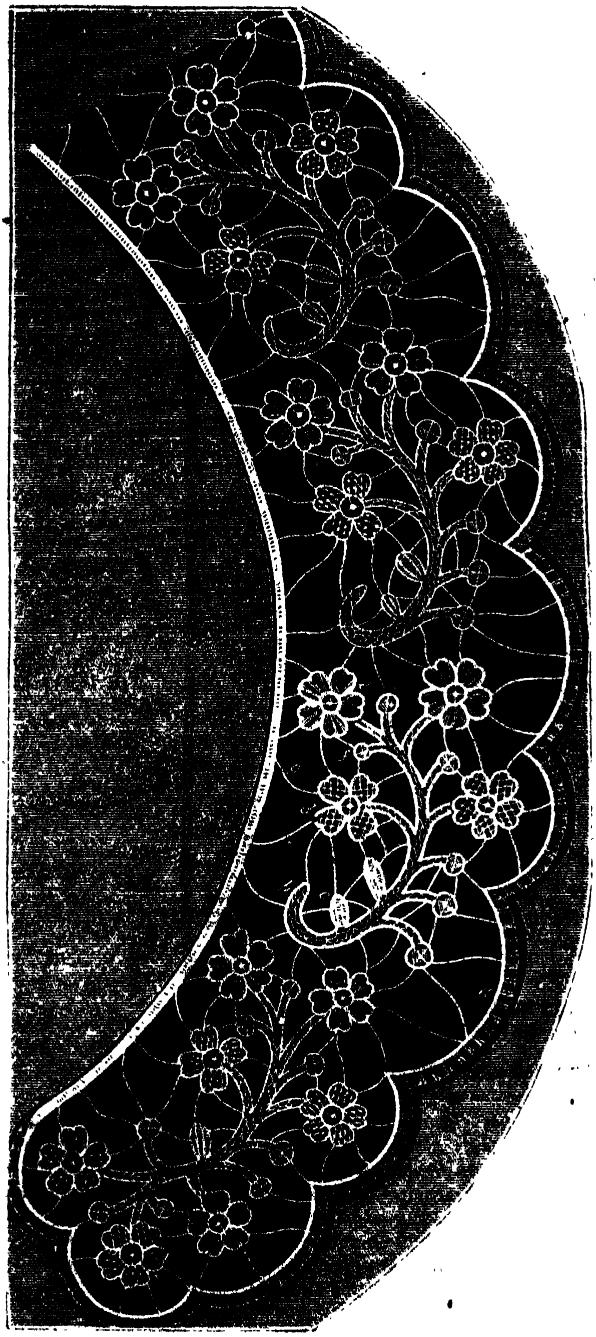
Sinople (green), from *Stin*, herb, verdure, and *Blo*, that which gives birth to the fruits of the field.

THE LADIES' DEPARTMENT.

POINT LACE COLLAR.

We here introduce the design for this beautiful piece of needlework; a full description for working which was given in our last article of this department, pages 269-70.

COLLAR.—FULL SIZE FOR WORKING.



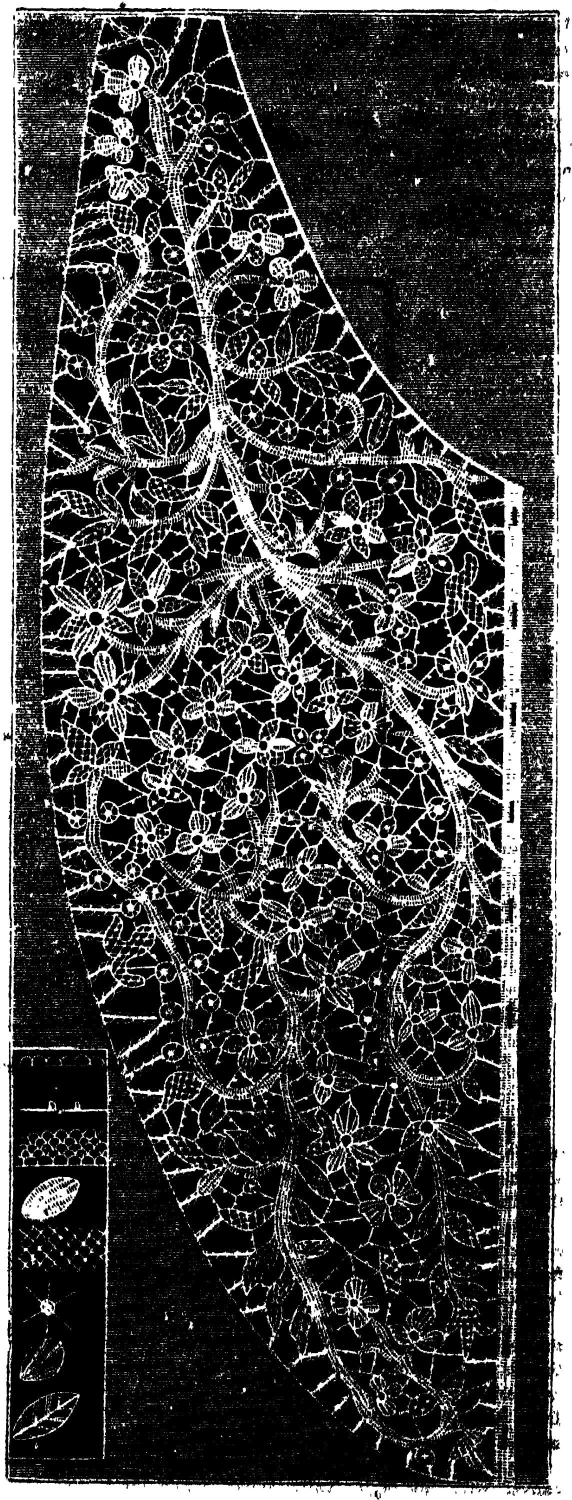
CHEMISETTE IN ANTIQUE POINT.

Materials.—Point lace cottons, and Mecklenburg No. 8.

The pattern of this chemisette is given one-half the size that it ought to be worked. It must, accordingly, be enlarged according to the directions for enlarging patterns.

Draw it first on tracing-paper, from which transfer it to pink or green, which must be lined with alpaca. The tracing paper being so transparent, the design is as clear on the wrong side as on the right, so that by laying it first on the one side and then on the other of the coloured paper, both sides of the chemisette will be obtained.

CHEMISETTE.



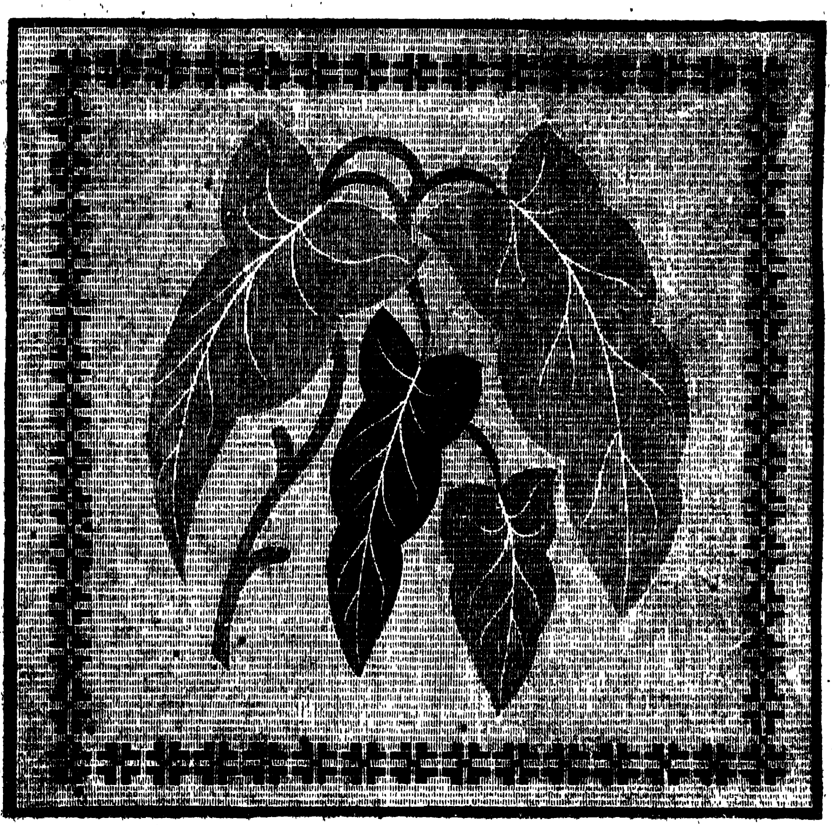
All the outlines are done in Mecklenburg No. 8, laid on with a much finer thread. Some of the stitches are modern point, and the flowers, which are filled up closely, as well as the stems which form the foundation of the sprays, are done in antique. The stitch used for all these is termed *foundation* stitch. It consists of Brussels stitches worked quite closely over bars of thread, and must be done in Mecklenburg 150, the finest thread made.

Some of the open petals are filled with English lace, others with Brussels, and some with Henriquez lace, all being worked in sewing cotton No. 100. The radiating English bars are done in Mecklenburg 120. The edged Venetian in the same thread, and the Raleigh bars, which form the ground in Mecklenburg 100.

MAT FOR AN URN, IN GOLD MOSAIC.

MATERIALS.—A square of coarse French canvas, 30 yards of gold braid, an ounce of each of six shades of vert d'islay Berlin wool, and a mesh rather more than half an inch wide.

This mat is worked in one of the simplest and most effective styles of Berlin work, and as Mosaic gold braid only is used, the materials are by no means expensive. When purchasing the requisites for working it, select the braid *first*, and then choose canvas of such a size that two threads are covered by the width of the gold. Five of the shades of wool should be consecutive, that is, with the slightest possible difference between each one and the next to it; but the sixth should be two degrees darker than the fifth.



MAT FOR AN URN.

The design is a group of the leaves of the Dragon-Arum on a gold ground, surrounded by a small border of green. The mat is finished off with a raised wool border. All the veinings of the leaves are left in gold.

TO PREPARE THE PATTERN.—Sketch a group of leaves, from the design, enlarging it to any size you may desire, and transfer the drawing to thick white paper, inking the outlines as darkly as possible. Lay this under the canvas, which you will mark from it, using a camel's hair brush dipped in ink. Allow a margin of at least 50 threads, every way, for the borders.

TO WORK IT.—Cut off a length of braid and run it on the canvas, with silk of the same colour, across the bottom of the mat, immediately below the point of the smallest leaf. Put on two more lengths in the same way. Lay on a fourth, and begin working the border, with the darkest shade of wool but one. The stitches are taken across the braid, quite straight, thus crossing two threads in height and none in the width. Two such stitches are equal to a square of canvas. Where the ground is to appear, the space is left. A single row of gold, and one completely covered with wool, finish this side of the inner border.

In working the leaves, take care to shade them accurately. Each leaf is worked in two shades, the lower side in the darker tint, and the upper one a shade lighter. (See Instructions in Embroidery.) According to this rule, that part of each leaf nearest the centre of the mat is the darkest. The small leaves are done in the two faintest tints of green; the large ones in the third and fourth shades; the stem (up to the part where the leaf falls over it) in the darkest shade, and the upper part in the fifth. Each line must be worked on the braid, before the next piece is laid on, for the obvious reason that otherwise the ink marks would be covered. The sides of the inner border must be worked to correspond with the end, allowing six threads of plain gold between it and the leaves.

The raised border is worked on the mesh, beginning twelve threads from the outer row of braid, and using the darkest wool. Then the others are worked in regular order, the lightest joining the inner border. It must then be cut and combed, to produce the even velvet-like surface proper for such work.

A strong card-board should be placed between the mat and the lining, to make it stronger, and more durable.

DIRECTIONS FOR WASHING TATTING.

Cover a wine-bottle or jar with stout calico, over which stitch the work very evenly; cover that again with book-muslin, wash it well with white soap, and then rub it with a good deal of starch. Allow it to dry a little, then clap it between the hands to clear the loops—place it between clean linen cloths, and iron it well. Iron it in one direction, not up and down, as it would displace the picots.

Properly washed, tatting looks as nice as when quite new.

SPLITTING A BANK-NOTE.

SOME time ago the commercial world was taken by surprise by the announcement that a certain scientific gentleman could actually split a bank-note so exactly into halves, that it was impossible to distinguish the separate pieces of paper from genuine notes. The authorities of the Bank of England took alarm; for it appeared that this invention would speedily open the way to a new kind of fraud. The imitation of the engraved plate, however well performed, was always discoverable by experienced eyes; and he must be a good forger indeed who could prepare the paper on which the plate was printed so as to imitate the the peculiar water-marks on the Bank of England note with anything like success. But here was a discovery which set at nought the precautions of paper-makers, engravers, and printers. It was really a serious matter. A long correspondence ensued between the proprietor of the secret and the officials of the bank—the former asking a large sum of money for his knowledge, and the latter requiring actual proof of his ability to perform the alleged feat. Paragraphs began to appear in the newspapers, and public attention was drawn to what seemed a very extraordinary fact—that the thin tissue paper of which a bank-note is composed could be really divided into two leaves. It became necessary to test the truth of this remarkable discovery; and so it was arranged that trial should be made with an actual note of the Bank of England. Preliminaries were settled; and a note properly marked so that it might be afterwards identified, was submitted to the inventor. In the course of two or three days back came the note to the owners, actually split in two. It was eagerly examined, but in a little time the bank officials ceased to feel any alarm, and confidence in the commercial world was quite restored. It was true that the bank-note was completely split, but it was also true that on only one half of it was the printed impression sufficiently plain to allow of its being circulated. Any attempt to pass the other, or back half, of the note would, it was declared be immediately detected, still the discovery was curious, and *might* lead to disagreeable consequences should any persons attempt to increase their wealth by means of split bank-notes. Another kind of ink was therefore ordered for the future to be used in the printing of the bank securities, so that in case any one chose to try the experiment, the one half would be left blank.

The secret, however, did not remain long hidden from the world. Indeed, its very simplicity seems to have prevented its being discovered by the clever men who felt so much anxiety about. The method of splitting the paper of the thinnest texture is just this: two pieces of calico are firmly cemented on to the sides of the paper, leaving the ends of the calico loose, and the whole is perfectly dried. By a gentle and equable pull on each side, the paper is split into halves, one of which adheres to the calico on the one side and the other to the opposite. The adhesion between the paper and the cloth being greater than that of the surfaces of the paper to each other, is the cause of this phenomenon. Having now divided the bank-note or other piece of paper, the two halves may be removed by damping and so loosening the paste between the calico and the paper. Of course, the secret is no longer the property of one person. In the Exhibition of 1851, Mr. John Kirby, of Lambeth, and Messrs. Leighton, the bookbinders, had several specimens of split paper; and it appears that the discovery of this property in paper may be turned to many useful purposes—one of which is, the removal of letter-press printing from the back of wood and other engravings.

THE ODOUR OF PLANTS.

THE most favourable time for ascertaining the vast variety of the odours of plants is the evening after the setting of the sun, the heat of the day preventing them sending forth their aromatic scent during its continuance.

Their various odours are methodically classed into seven distinct divisions, which are recognised by nearly all botanists. 1st, the *aromatic odour*. This includes the laurel, the orange, and the whole of that class of plants; 2nd, the *sweet odour;* this is extremely grateful and pleasant, such as is caused by the flowers of the linden, the jessamine, the nightshade, the rose, &c.; 3rd, the *ambergris*, or *musk*,—namely, geraniums, exotics, and others of that species; 4th, the *alliacea* odour, which characterises nearly all kinds of lilacs; 5th, the *fetid* odour which distinguishes certain plants; 6th, the *soporific* odour, such as is sent forth by opium; and 7th, the *nauseous* odour, caused by venomous plants. We have but an inadequate idea of the power of these botanic exhalations, in many cases these odours produce disease and sometimes death. Sleeping in a room where plants are kept is particularly dangerous.

COST OF WATER IN THIRTY-TWO TOWNS.

THE following "tabular statement of the cost of water in thirty-two towns," visited by William Lee, superintending inspector, with the prospective cost of water in the same places for thirty years, under the Health of Towns Act, will be found interesting. Prefixed to the table are the following remarks:—

"In considering the following table, it must be borne in mind that the sums of money placed under the head 'Present supply of water' are deducted from the evidence of the inhabitants themselves, and represents a very limited quantity of water from sources very commonly polluted with animal and vegetable refuse, and frequently containing a large quantity of earthy matter in addition; that the water is generally hard, unfit for cooking, and wasting a large quantity of soap and labour in washing; a supply which is the worst in quality and most deficient in summer, when plenty of pure water is most needed, which is often frozen up for weeks during winter; with pumps sometimes out of repair for months, and for water carried often from very considerable distances; a supply precariously eked out by cisterns, and casks containing rain-water from house-roofs, mixed with soot and other impurities, and frequently vapid, stinking, and unwholesome. The sums named under the head 'Proposed cost,' &c. &c., are for supplies of pure water, with a tap in every house constantly on at high pressure. The last column shows the annual saving to each place in money alone, irrespective of improved health and comfort, from the construction of proper works.

Place.	Population.	No. of Houses	Present Cost of water per week			Proposed Cost under the Public Health Act.			Ann. Saving.
			First Class.	Second Class.	Cottages.	First Class.	Second Class.	Cottages.	
			d.	d	d	d	d.	d	£
Market Harbro'	2667	478	5¼	3¼	3¼	1½	1½	1½	181
Great Bowden...	1320	265	3¼	3¼	3¼	1½	1½	1½	100
Little Bowden...	508	92	3¼	3¼	3¼	1½	1½	1½	31
Ashby de la Zouch	4175	855	5¼	5¼	5¼	1	1	1	768
East Retford ...	2860	608	2¾	2¼	2¾	1½	1½	1½	164
West Retford ...	643	127	2¾	2¾	2¾	1½	1½	1½	36
Clarborough ...	2302	363	2¾	2¼	2¾	1½	1½	1½	98
Ordsall	1108	133	2¼	2¼	2¼	1¼	1½	1½	36
Bacup	8000	1500	10¼	6¼	3¼	1½	1	1	812
Swaffham	3414	700	19	19	19	1½	1⅓	1⅛	2654
Loughborough	11000	2410	3	3	3	2	1½	1	783
Knighton	1428	261	[illegible]	9½	9½	1½	1½	1½	439
Mileham	532	122	[illegible]	4½	4½	1⅓	1½	1⅓	79
Godmanchester	2152	472	[illegible]	4¼	4¾	2	2	2	244
Epsom	4200	634	4¾	3½	5¼	2	1½	1	412
Holbeach.........	3250	650	6¼	2⅛	2	2	2	2	281
Newcastle-under Lyme	10132	1999	9	5	4	9¼	2½	1⅓	999
Burslem	17503	3529	9	5	4	9¼	2½	1½	1760
Nantwich	6000	1034	7½	2½	3⅙	2	1½	1	476
Ely	7603	1552	7½	3	2¼	1½	1½	1½	504
Litton	864	154	7	7	7	1	1	1	200
Ross	3170	700	8	3½	3	2	1½	1	303
Reading	22715	4260	12	6	2¼	2	1½	1	5859
Gainsborough ...	8151	1715	7	3½	2¾	2	2	1½	659
Yarmouth	28019	6040	6¾	4	3½	2	1½	1	3480
Gaywood.........	1208	255	7	4	4	2	2	1½	110
Alfreton	2000	350	4	6	4½	2	1¾	1	94
March	6296	3107	6	4	3½	2	1½	1½	707
Selby	6190	1138	7¾	3¾	2	2	1½	1	493
Norwich	62344	16383	12½	4¼	2¾	2	1½	1	8294
Worksop	4025	854	8	3	3	2	1½	1	370
Wisbeach	8530	1935	6¾	5	5	2	2	1½	1491
Total	244918	52875	...	...	...	...	...	...	32951

THE LONGEVITY OF TREES.

MANY of our forest trees require a long series of years to arrive at their full height and vigour. The oak, the elm, and the cedar are of this class. Others, on the contrary, are distinguished for a more rapid growth, but their wood is tender and light, and does not possess any of those characteristics which render the wood of other trees so valuable. Among these are the Poplar, the Acacia, &c. The general height to which forest trees attain is about one hundred and twenty feet, and their circumference is rarely less than twenty or five and twenty feet. If placed in favourable situations they flourish for a very long period, the olive commonly attains three hundred years, and the oak more than double that period.

In such trees as the pine, the fir, and the oak, a fresh layer of wood is formed every year, and as this process is preserved with the greatest regularity, the naturalist is furnished with the surest evidence of the age of the tree which he examines. By this means some curious and interesting discoveries have been made. Thus, in the Cape de Verd islands a Baobab tree was found, measuring one hundred feet in circumference, and which was proved to have existed for more than six thousand years. This would render it contemporary with the first man, and make it, perhaps, the only remaining specimen of that wonderful vegetation which the new-made world brought forth at the word of God.

In the neighbourhood of Mont Blanc there is a fir-tree still remaining, called by the people of that district the *Chamois Stable*, because it affords a shelter to the wild goats during the winter. Its enormous trunk and beautiful vegetation make it a remarkable and interesting object, especially when it has been ascertained by M. Berthelet that it is more than twelve hundred years old. At a short distance from this ancient fir is found, in the forest of Ferré, a tree called the Meleze, which measures around the top of the root eighteen feet. The age of this tree cannot be less than eight hundred years.

The forest of Parey-Saint Ouen, canton de Bulgneville, in the department of the Vosges, is famous for a tree called *The Oak of the Partizans*. Its height is one hundred and seven feet, while its gnarled branches extend over the space of a hundred. It has been in existence six hundred and fifty years, and was known at the time when the bands of the Cothereaux, the Carriers, and Routiers devastated France in the old days of Philip Augustus.

A chestnut-tree near the village of Vernet, of ordinary size and height, is supposed to have been planted in the time of Calvin, at the dawn of the great religious struggle in Switzerland.

The monuments erected by the hand of man in an age which we call antiquity, lose their interest and become insignificant before these veterans of vegetation. They speak to the imagination far more powerfully than any cast-down temple or ruin. The columns overthrown, the wreck of history, the monuments of a day, sink down before the strong tree of the forest. Struggle after struggle, battle after battle, goes on in the world's arena, and one after another its heroes perish, but the organic development of the tree proceeds without interruption, and each year it gives to the world much more than it receives.

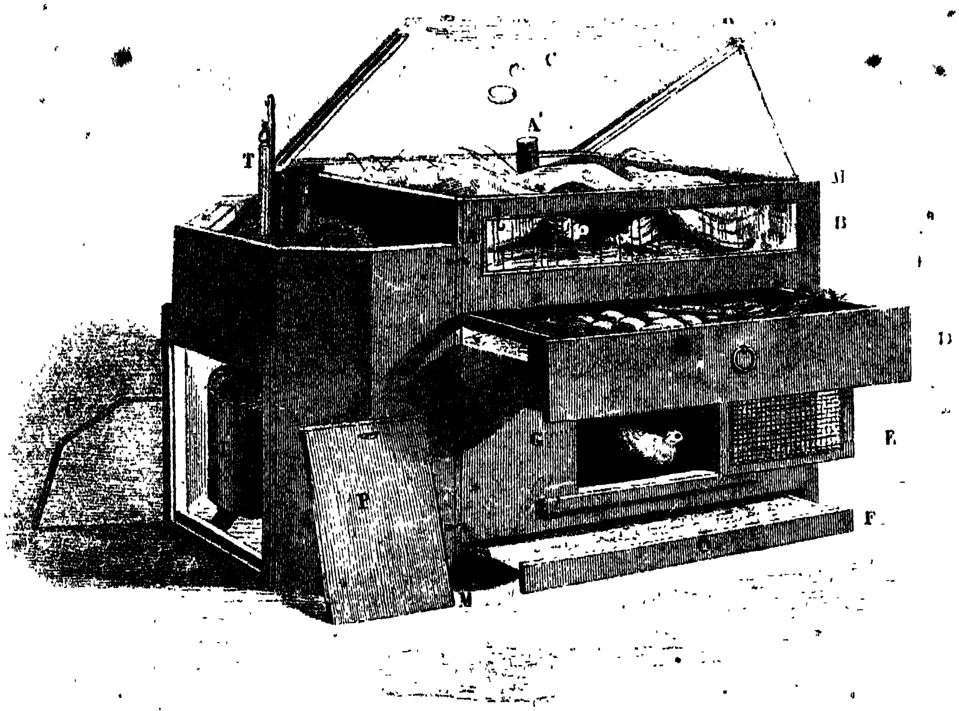
ARTIFICIAL EGG HATCHING.

AN invention by a French gentleman named M. Vallée, for the purpose of hatching the eggs of various animals by the application of artificial heat, has been placed in the Jardin des Plantes at Paris, and has recently attracted a good deal of attention. He calls it the "*couveur perfectionnée*." It is made of wood, and is composed of a large square box, and a projecting drum or cylinder at the side. The former is about two feet and a half in breadth, and about three feet in height. It is divided into three compartments or chambers; one of which (D) contains the eggs about to be hatched; the other above this one (B) may, if necessary, be applied to the same purpose, but usually it is appropriated to the reception of the young ones immediately after they emerge from the shell. It has a lid which opens something like that of a snuff-box, by means of hinges placed behind, and is glazed in front. The third compartment at the bottom (E), somewhat resembling a cage, is used as a sleeping-place for the chickens during the first five days of their existence. A sash with wire grating extends across a third of the surface in front. At F is a sliding panel. The cylinder at the side is the same height as the body of the machine, and by means of four hooks, two upon each side, it fixes itself to it, [illegible] to be impervious to the air. In this cylinder is contained the heating apparatus. The part indicated by L, is filled with water; and a lamp is placed underneath, so as to maintain any temperature that may be desired. Two grooves are placed at each side, in which is a sliding door (F). The lamp is fed with oil, having burners and wicks upon Socatelli's plan, and will burn for thirty hours without replenishing. The cylinder is made of zinc, and contains about two gallons of water. Two thermometers are used, one of which is inserted in the cylinder T, the scale appearing at the side of the funnel at O; the other is placed in the principal drawer under the eggs.

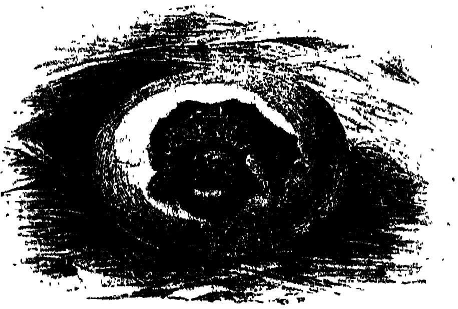
The heat is maintained by the circulation of the water. When its temperature is raised to a certain degree by the lamp, it of course expands, or rises in the cylinder, till it reaches the opening of a zinc pipe, through which it passes into a shallow, but wide basin placed between the upper and lower drawers. From this it passes again downwards, by means of another zinc pipe, into which it enters at the right end of the machine. It then enters into the lowest compartment of the machine, passing along its whole length, and once more enters the heating cylinder to go through the same process again.

The upper part of the machine is traversed by another pipe, the upper extremity of which may be seen at A. The lower reaches to the level of principal drawer at D. This is a sort of ventilator, serving to admit air whenever the temperature becomes too high. It can be opened or closed at pleasure by means of an ordinary cork or stopper. There are other air-pipes also, which pass from the heating apparatus horizontally to E, and thence upwards to D, for the purpose of introducing hot air into the principal drawer. Upon each of two sides of the machine there are eight circular openings or valves, each about a quarter of an inch in diameter, four of which are placed at the upper part of the glazed compartment, and four at that of the middle drawer. Those on the right are for the introduction of cold air, and those on the left that of hot air. They are opened or shut also, by means of corks or stoppers, and the alternate currents of warm and cool air to which they give entrance, are indispensable for the complete renewal of the air in the interior.

The hatching machine, notwithstanding its apparently small dimensions, can contain upwards of one hundred hen-eggs, and has hatched not the eggs of birds or fowls only, but those of reptiles also. It has successfully hatched great numbers of the eggs of pheasants, partridges, hens, ducks, pea-hens, geese, and guinea-fowl; also of adders, vipers, green and yellow lizards, and more recently those of a tortoise. This is the first time that the eggs of the last-mentioned animal have ever been artificially hatched. Three of its eggs were placed in the machine, but in the case of one only was the experiment successful. Our engraving gives the egg and the young animal in life-size, as the latter appeared when issuing from its prison by an aperture made in *the side* of the shell. This is a physiological fact worth notice, as the young of birds always make their way through the end of it. The egg of the tortoise took sixty days in hatching. It was placed in the machine on the 14th of July, and the young one made its appearance on the 14th of September. In its natural state the tortoise lays its eggs in the middle of summer, and deposits them, generally varying in number from two to four in a hollow in the ground, and covers them up with sand or clay, in a place exposed to the sun's rays, and takes no further care of them. In autumn the young ones make their way out unaided. The fact that the care of the mother was not necessary to the process of incubation, made it evident, that by a careful observation of the temperature of the regions in which tortoises are found, it might be successfully carried on in the hatching machine. The event has answered expectation, and has at the same time furnished to naturalists a fact of which they were previously ignorant,—namely, the length of time which is occupied in the hatching of the eggs of this animal. Similar information has been acquired with regard to the eggs of various others. The eggs of the water-adder were placed in the drawer, buried in clay, and covered with moistened linen or sponge on the 25th of June, 1846. The temperature was then raised to 67° or 70° Fahrenheit. They were hatched on the 26th of July following, just thirty-one days after. On another occasion, the eggs of the same animal, placed in the machine on the 30th June, were not hatched until the 2nd August, a difference which was doubtless owing to some slight want of uniformity in the temperature, and showing the great care which the process requires.



ARTIFICIAL HATCHING MACHINE.



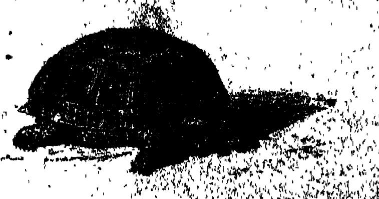
TORTOISE EMERGING FROM THE EGG (LIFE-SIZE).

Many other experiments have given similar results. But there is one thing worthy of remark in connexion with the eggs of some reptiles. Some of those, the time of the hatching of which, by the natural mode, is known to be from 56 to 60 days, when enclosed in earth, and kept moist by wet sponge or linen, and, placed in the hatching machine, take only 30 or 32 days for the appearance of the young. Other experiments have given the following results:—

Pheasant	25 days.
Partridge	24 ,,
Hen	21 ,,
Common-duck	28 ,,
Barbary duck	30 ,,
Pea-hen	28 ,,
Goose	30 ,,
Guinea-fowl	25 ,,

It may thus be seen that the machine hatches the hen's eggs four or five days sooner than she herself can.

As soon as the process becomes better known, and, doubtless, simplified and made less expensive, it will, we venture to say, be extensively used in the country, as a good means of increasing a very important part of the income of the farmer's wife. The hen, as every one knows, often breaks her eggs, or abandons them, or kills the chickens; and the time she spends in sitting and rearing her young, varying according to the season, or for other reasons, from three to four months, is lost, as far as laying is concerned, as, if she were not allowed to hatch her eggs, she would soon begin to lay again.



YOUNG TORTOISE (LIFE-SIZE).

A profit might be made in this way, also, from the eggs of grouse, partridges, &c.; and in a scientific point of view the hatching machine is of great value. It has been already employed to some purpose in making embryological researches, and will, doubtless, from time to time, be the means of making known to us many facts relative to the physiology and habits of certain species of animals with which we are at present unacquainted.

A hatching machine, much upon the same principle, is being at present exhibited in Leicester-square.

TITIANO DI VECELLI.

In the small town of Pieli, situated on the confines of the Piuli, in the midst of wild mountain scenery, Titian was born in the year 1477. He began very early to give evidences of his taste for drawing, and at the age of ten years designed a figure of the Virgin in the juice of flowers, the only colours within his reach. He was sent the same year by his father to a maternal uncle who resided in Venice, and he here became the pupil of Giovanni Bellino, in whose house his uncle placed him. Lanzi states, however, that he learnt the rudiments of his art from a painter at Trevigo, named Sebastiani Zuccati, and that he became an imitator of Albert Durer, who visited Venice in 1495, and again in 1506. The pictures painted during the first few years of his career as an artist, display, as might naturally be expected, much of Bellino's style. "Tobit and the Angel," the "Birth of Christ," and the "Portrait of Catharine Cornaro," queen of Cyprus, who had left her kingdom to the republic of Venice by will, all display proofs of this. The "Presentation of the Virgin Mary in the Temple" was painted at this period, and notwithstanding the youth of the artist, is a striking monument of his genius. It was twenty-two feet in length, and contained a great number of portraits, amongst others those of Andrea Franchescini grand chancellor of Venice, in a scarlet robe. By the side of the steps leading to the temple is an old countrywoman with eggs and fowls in a basket, so true to nature as to be quite a deception, and said to be the likeness of one who frequented the Rialto at Venice. The background is a grand mountainous landscape, with a large and very striking light in the sky, and the colouring is extremely rich.

THE CASKET, FROM A PAINTING BY TITIAN. DRAWN BY STAAL.

At the age of eighteen Titian became intimate with the celebrated Giorgione, who was a fellow pupil, and an inmate of Bellino's house. The personal beauty of the latter, his fame as a painter, and his exquisite skill in playing on the lute, had already won him the smiles and favours of the Venetian aristocracy, from whose exclusive circles his low birth would otherwise clever as she was beautiful, and, happier than Tintoretto; he did not survive her. His female portraits would form an admirable collection were it possible to bring them together. What a splendid sight to behold in one room the tender brilliancy of Laura Bianti; the spirited and charming, but maligned Lucrezia Borgia; the dignified Giula di Ponte; and the amiable and learned Signora Irene; and many others from all parts of Europe, whose charms that sublime pencil has immortalised!

THE BOA CONSTRICTOR.

The great nursery of the reptile race is found in tropical regions. Tangled forests, impenetrable jungles, morasses teeming with luxuriant vegetation, and mouldering ruins overgrown with brushwood and creeping plants, are their favourite places of abode. There they not only exist, but swarm; there the most gigantic of their tribes rears its resplendent form; and there thousands of every size and hue astonish or alarm the passer-by.

Some species, slender as whipcord, and of great length, twine around the twigs and boughs of trees and shrubs, their tints amalgamating with the colour of the foliage that conceals them, while rapidly and silently they glide even to the tops of the loftiest trees, in chase of insects and of the eggs and young of birds. Others may be beheld by the traveller darting along the ground, crossing his path, plunging into the midst of the jungle, ere his eye can catch their tints, while a loud and angry hiss sufficiently intimates that it is perilous to follow.

In the Dutch colonies of the East Indies, André Cleyer is said to have purchased of the hunters of the country an enormous serpent, in the body of which he found a deer of middle age, absolutely entire. In another individual of the same species, also examined by this traveller, he found a wild goat, with its horns; and a third had evidently swallowed a porcupine with his quills. He also adds that a woman became the prey of a reptile of the same genus in the island of Amboyna, and that this kind is sometimes kept for the purpose of attacking buffaloes in the kingdom of Arracan, on the frontiers of Bengal. We need hardly be astonished at this, when Prince Maurice, of Nassau Siegen, one of the governors of Brazil in the seventeenth century, assures us that he himself was an eye-witness of stags and other bulky animals, and even of a Dutchwoman being devoured in this manner, when he commanded in the regions of South America. Analogous facts concerning a serpent called Bajo are found in "The History of the Orinoco;" and a multitude of others of the same kind are given in the various works of credible travellers.

The Latins are said to have given the name of Boa to serpents of extraordinary magnitude, from the idea that these reptiles drained the udders of cattle in their pastures; and though the notion is unfounded, the name, from its being convenient and long established, is still retained by modern naturalists. First applied by Linnæus to the huge serpents inhabiting the tropical regions, it is now restricted to a group peculiar to the intertropical parts of America, while the term Python is applied generically to the large snakes of Africa, India, and the islands of the Eastern Archipelago.

THE BOA CONSTRICTOR.

The Boa Constrictor, of which we give an engraving, is remarkable for the beauty of its markings. A broad chain, consisting alternately of large blackish and somewhat hexagonal marks, and of pale, oval dashes, extends along the back, forming a very elegant design. To this creature the epithets "king," "emperor," "divine," have been given, as indicating its superiority over all reptiles. Often tamed by the priests, for the purpose of overawing the multitude, it has been the subject of homage, which Southey has thus pourtrayed:—

> "Forth from the dark recesses of the cave
> The serpent came. The Hoamen at the sight
> Shouted; and they who held the priest, appall'd,
> Relax'd their hold. On came the mighty snake,
> And twined in many a wreath round Neolin,
> Darting aright, aleft, his sinuous neck
> With searching eye and lifted jaw, and tongue
> Quivering, and hiss as of a heavy shower

Upon the summer woods. The Britons stood
Astounded at the powerful reptile's bulk—
And that strange sight. His girth was as of man,
But easily could he have overtopp'd
Goliah's helmed head, or that huge king
Of Basan, hugest of the Anakim.
What, then, was human strength if once involved
Within those dreadful coils! The multitude
Fell prone and worshipp'd!"

The vast power and activity of these creatures were manifest in an adventure which Stedman had with one of them, in his expedition to Surinam. On leaving his boat, he had scarcely proceeded twenty yards through mud and water, when he discovered a huge snake rolled up under the fallen leaves and rubbish of the trees, and so well was the animal covered, that it was some time before he distinctly perceived the head of the monster, which was at the distance only of about sixteen feet. Rapidly vibrating its forked tongue, and its eyes glittering like sparks of fire, he raised and discharged his gun, but missing the head, the ball passed through the body. In a moment the animal struck round, lashing the ground with such force as to cut away all the underwood, as if by a scythe, while the mud and dirt flew in all directions. Following up the attack, Stedman, who at first retreated, now ventured on and found the snake at a short distance from the former station, quietly lying among fallen leaves, rotten boughs and moss, which concealed all but the head. He fired again; the animal was again wounded, and violently flounced about, throwing around a shower of mud and dirt. At the third fire it was shot through the head, and soon expired. The length of this snake, which the negroes declared to be young, was upwards of twenty-two feet; and its thickness that of a boy about twelve years old.

INCUBATION OF THE PYTHONESS.

These huge snakes act like the tiger, taking their prey by stratagem. On the swampy margin of rivers, the borders of lakes, the tangled underwood that skirts the dark and marshy forest, they lurk, half floating in the water, half stretched on the land, or partly twined round some rugged trunk, to the bark of which their colours assimilate. Rapid as the arrow's flight, or the lightning's flash, they dart on their victim, instantaneously throw their bodies into folds or knots around that of their prey, and so great is their strength that the bones of a deer, or even an ox, snap beneath their efforts.

The following account of the incubation of the python was given by M. Valenciennes, in a paper read before the French Academy of Sciences, at Paris:—

"On the 5th of May, 1841, a pythoness, usually very quiet and tractable, exhibited great signs of uneasiness and much irritability, and on the following day laid fifteen eggs, commencing at six o'clock A.M., and ceasing at half-past nine. The shells were soft, and of a grey ashy colour, and were slightly inflated with air. The female, when left to herself in her box, gathered them all in a heap, and twined the lower part of her body around them, so that at last she had formed a sort of spiral cone, of which her head was the summit, and so well were the eggs covered that only one was visible. By violent contractions of the trunk, she repelled all attempts to touch them, and manifested such impatience, that at last any one who attempted to approach her, was in danger of being bitten. Although these animals are naturally very cold, the heat of the body in this instance was easily felt by the hand; and on the thermometer being placed on the top of the cone containing the eggs, the mercury rose to 73° F., although the temperature in the shade was only 52°, and that of the room only 50°. After fifty-six days of hatching, during which the serpent did not change her position for one instant, the shell began to break, and the heads of the young ones appeared; but the little animals remained within, never showing more than the two extremities of their bodies for one day. On the 3rd of July most of them extricated themselves altogether and crawled about on all sides, the last obtaining its freedom on the seventh. Of the fifteen eggs only eight were hatched, the others being crushed or broken. During the whole time the female manifested no desire whatever for food, but on the twentieth day the keeper placed a bucket of water within her reach, into which she instantly plunged her head, and drank about two tumblers full. She drank five times afterwards in the same way. This seems to prove that she was in some sort of febrile state. It was only on the 3rd of July, early in the morning, that she showed any inclination to eat, and then without quitting her position, devoured about six pounds of beef. She immediately left the eggs, and never testified the least affection for her young. After issuing from the shell the latter drank a great deal of water, and plunged their bodies in it, but did not eat until they had thrown off their old skin and got a new covering, which took place between the tenth and fourteenth day."

THE RIDDLE, HISTORICALLY CONSIDERED.

Despise not the riddle; great men and good men, old men and young men, the youth, the maiden, and the child have been given to riddles. Despise not the riddle—it has sharpened the wits of many, it has aided and comforted the mathematician, it has enlivened the festive board. Despise not the riddle—it is a species of intellectual discipline, it is a source of social recreation. Of old it was the trusted handmaid of philosophy, as well as a shaft in the poet's quiver. It is the assertion of Athenæus that "skill in riddles is akin to philosophy." And all the world knows that the ancient oracles were little else than religious riddles.

The home of riddles is the East. There the riddle was born, and there it still lives. The Egyptian Sphinx is a riddle bequeathed to us from the earliest ages. The oracle of Apollo at Delphi was an ecclesiastical manufactory of riddles. Before men had so many theological, metaphysical, and social questions to solve as they have now, they consumed their supererogatory wits and energy in constructing and solving intellectual puzzles.

Specially is the riddle a companion of the social circle. So was it from the earliest times. The feast and the banquet have been its chosen places. The riddle cannot be accused of selfishness. No man tries to puzzle himself. It is a mental wrestling; there must be at least two to a riddle.

First in most things—first in history and poetry as well as in religion—the Bible is first in Riddles.

"Out of the eater came forth meat,
Out of the strong came forth sweetness."

In this riddle, which Samson "put forth," we find all the chief elements of the ancient riddle. It is an intellectual puzzle it is expressed in verse, it is propounded at a social gathering, its solution is required within a fixed time, a reward is offered for success, a penalty is attached to failure (Judges xiv. 12, *et seq.*).

The mental play proposed by Solomon was considered as both an exercise and a token of practical wisdom. Hence, among the objects for which the book of Proverbs was written we find this one:—

"To understand a proverb and the interpretation;
The words of the wise and their dark sayings."

Accordingly, a mental tournament took place between Solomon and the queen of Sheba, who travelled from a distant land to Jerusalem expressly "to prove" that monarch "with hard questions" (1 Kings x. 1, *et seq.*), while on his part, he "told her all her questions, there was not anything hid from the king which he told her not" (ver. 3). According to Josephus, a similar contest took place between Solomon and Hiram, king of Tyre. "The king of Tyre sent sophisms and enigmatical sayings to Solomon, and desired he would solve them. Now, so sagacious and understanding was Solomon, that none of these problems were too hard for him, but he discovered their hidden meaning and brought it to light" (*Antiq.* viii. 5, 3. Solomon appears to have returned the favour with interest, for "Solomon sent problems to Hiram to be solved, and desired he would send others back for him to solve, and that he who could not solve the problems proposed, should pay money to him that solved them. And when Hiram had agreed to the proposals, but was not able to solve the problems, he was obliged to pay a great deal of money; one Abdemon, however, a man of Tyre, did solve the problems, and proposed others which Solomon could not solve; upon which he was obliged to pay a large sum of money to Hiram" (*Joseph. Apion*, i. 17).

It is, however, in the ancient Greek literature that we find the riddle in its fullest state of development. At first, interspersed in the writings of its early poets and philosophers, riddles in time became a distinct species of mental production, and being professionally treated of by the rhetoricians of its latter days, were by them described, classified, and criticised. The reward and the penalty proposed by Samson, were thirty under and upper garments. Among the Greeks the reward was the applause of the company, or chaplet of flowers; the punishment, a goblet of unmixed wine, or a "glass of salt and water. Of Greek riddles take as specimens these: "What is that which is everywhere and nowhere!" "What is that which is the same in heaven, on the earth, and in the sea?"

The Latins were too much given to action, to war, and to government, to excel in exercises of mental skill. In Virgil's *Bucolics*, however, we find the rival swains engaged in what in Lancashire would be called "setting each other craddies;" that is, proposing riddles. Thus Damœtas says to Menalcas—

"Say where the round of heaven which all contains
To three short ells on earth our sight restrains.
Tell that, and rise Phœbus for thy pains."

And Menalcas says to Damœtas—

"Nay, tell me first in what new region springs
A flower that bears inscribed the name of kings;
And thou shalt gain a present as divine
As Phœbus' self, for Phillis shall be thine."

NATIONAL AIRS.

Nations are distinguished by their *music*, as well as by their language and customs. Not by that scientific music which all civilised countries enjoy in common, but by their home-made ballads, and those simple country songs which resist the innovation and the progress of art, and maintain their own characteristics to the last. These songs are easily recognised: no one would confound the "*Ranz de Vaches*" with a Polish chant, nor a Spanish song with an Irish melody.

When, or how, or by whom these airs originated, it would, in most cases, be impossible to say. Military songs were composed to celebrate some wondrous feat of arms, and were in the old time commonly written in Latin. Of this kind was the French popular air "*Vive Henri IV.*" Many of our most simple and beautiful airs have been transmitted from generation to generation. The manners and customs of a people are affected by the language which they speak; their genius, their enthusiasm, their climate, and the character of their soil, although diverse in their nature, exert a strong influence upon their national songs.

It is easy for an ear sensible to rhyme to recognise the peculiarities of the seguadilles, the boleros, and fandangos of *Spain*. These airs, so animated, and so different in character are sung and danced at the same time, accompanied by the guitar and the castanets. There is another Spanish air, the "*Tirana*," more solemn than the preceding, which although chanted is never used as a dance. The Spanish, in ancient times, were said to be the best singers in Europe, and were celebrated for their performances on the guitar, making the evening breeze melodious with songs to their ladies fair. The song beguiled the weariness of the traveller, and added fresh joy and gladness to his journeys end.

At *Venice*, the most charming "*barcaroles*" were composed and sung by the gondoliers, and were transmitted from father to son. These compositions were not scientific but natural. It was heart speaking to heart. As they guided their gondolas over the great canals, their melodies arose now in lighter, now in sadder strains, their voices harmonising with the deep swell of the oars as their barks proceeded from Palazzo to Palazzo.

It is the musical genius of the Neapolitan fishermen which renders the songs of *Naples* so famous. Their songs, and those of the Venetian gondoliers, have been justly celebrated throughout Italy, and are not only an honour to themselves, but the wonder and admiration of other nations.

Sometimes these national songs originate in accident, sometimes they are caused by some great event. The Swiss *Ranz de Vaches* perfectly accords with the mountainous country which has given it birth, it is peculiarly adapted for the hill country. If sung in a room or saloon, the music is by no means agreeable; but executed upon the borders of the lakes, or among the rocks, or on the Alps, it possesses a charm which is indescribable. The stranger is astonished as its peculiarly melancholy strain is echoed and re-echoed, in long plaintive strains from the rocks about.

So it is with our own land, with Ireland, with Poland, Sweden, and the whole of northern Europe. National music is a feature common to all. Those of Poland are especially peculiar. The *Dumbka*, so plaintive and so melancholy, has still no possible likeness to Swedish music. The *Polonaise*, which is a song and a dance at the same time, is still of a grave and solemn character, and has been made use of by nearly all the composers of Europe. The *Krakoviak*, a song and dance, is full of gaiety and vigour. The *Mazurek*, or Mazurka, is well known in France and England. The most celebrated *Dumbkas*, are "The Death of Gregory," "The Adieu," "The Neighbours," and "The Lilac."

The *Irish* melodies are worthy of remark; they are of two sorts, gay and plaintive, both equally beautiful and touching, enough in the one case to make the tears flow freely, and in the other to fill the heart with gladness and teach the feet to dance. The national air of England is well known; its solemn strains are familiar to every English ear; it is justly celebrated; its very name is grand and serious: "God save the Queen" is a prayer full of energy and fervour.

The invention of *Scottish* ballads is attributed to the time of James I., king of Scotland. This prince was both poet and musician. During his reign, and to the time of James IV., a great number of melodies were composed, they became familiar to the people, were heard in village homes, in city streets, and far off country parts, and to this day are cherished.

The national songs of *France* are very great in number and variety. There are the songs of the dance, the hunting-songs, the songs of martial deeds and knightly prowess, of love and home, and chivalric romance, songs of every description that light hearts chanted centuries ago. Perhaps the most ancient and the most original is the famous *Chanson de Roland*, known to all France, mentioned by nearly every historian. They have a great number of gay songs, which have gained a strong hold upon the affections of the people. These ballads or songs slightly differ in the various provinces, two of them are better known than the rest. *Vive Henry IV.*, and *Charmante Gabrielle* are attributed to Ducamroy, master of the chapel to Charles IX, to Henri III., and to Henri IV. He died in 1609. They have a song called *Viens, Aurore, je t'implore*, both the words and music of which are said to have originated with Henry IV. The lays of the provincial troubadours, and the romances of the minstrels were the fashion all over Europe in the fifteenth and sixteenth centuries. The Italians composed many songs under the title of *Canzonette alla Francese*. The French were at all times great patrons of such productions. These simple refrains came into great vogue, and even the ecclesiastics were obliged to introduce into their chants and masses some characteristics of this popular music.

Among the national airs of modern times, the Marseillaise is beyond dispute the most remarkable. It is expressive of the utmost energy and indignation, and at the same time the finest musical composition. This admirable song, intelligible without words, is the work of Rouget de l'Isle; and there is no other musical work attributed to him. Travellers may hear this solemn chant in the monasteries of Sicily and Spain.

ADAPTATION OF THE COLOURS OF ANIMALS TO THEIR HAUNTS.

THE more we search into the habits and peculiarities of animals, the more are we led to admire the wisdom and goodness of the Creator. Throughout the animal creation, the adaptation of the colour of the creature to its mode of living, and place of concealment is highly remarkable, considered in reference to its preservation. If we look around, we shall discover that the colours of the smaller animals, and a multitude of insects, contribute materially to their safety. Caterpillars which feed on leaves are generally either green, or have a large proportion of that hue in the colours of their coats. So long as it remains still, how difficult it is to distinguish the grasshopper from the leaf or spray on which it rests! The butterflies that flit among the flowers are decked in varied hues like them. The little birds that haunt the hedge-row-side have feathers on their backs which harmonise with the colour of the leaves, and feathers on their breasts which borrow the white hue of heaven; these render them less visible to the hawk above, or to the prowling cat beneath. The wanderer in the fields almost treads upon the skylark before it rises, warbling merrily to Heaven's gate. The partridge can hardly be distinguished from the stubble amongst which it makes its nest; and it is considered an accomplishment for the sportsman to be able to find the hare sitting. In northern countries the winter dress of the hare and the ptarmigan is white like the snow.

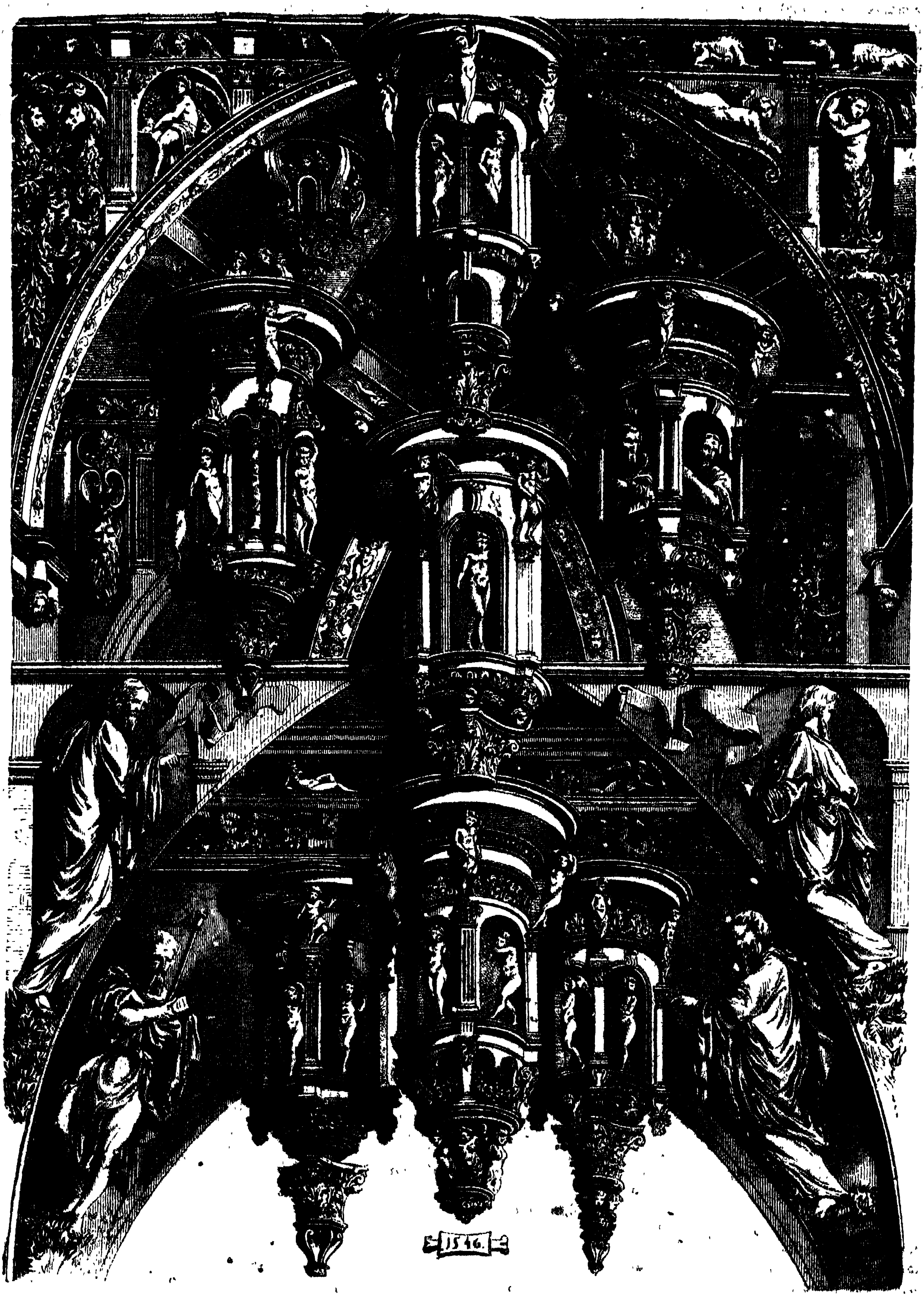
If we turn to the waters, we shall find that it is nearly the same with its inhabitants. Frogs vary their colour according to the nature of the mud or sand at the bottom of the ponds or streams they frequent; nay, the tree-frog (*Hyla viridis*) takes its name from the colour which is so difficult to see among the leaves, where it adheres by the cupping-glass-like process at the end of its toes. The fish, especially those which inhabit fresh-water streams, are distinguished by the same peculiarities. Their backs are comparatively dark, like the water above them, and it requires some practice to discover them as they glide along the bottom of the clear brook in thick dusky shoals. They come like shadows and so depart, under the gaze of the spectator. It is difficult to distinguish the pike—"the ravenous luce," as old Izaak Walton calls it—with its dark green mottled back and sides, from the similarly-tinted leaves amid which that fresh-water shark lies on the watch, as motionless and still as the leaves themselves; and it is even difficult for any eye but that of the practised angler to discover what shadowy form it is that ripples the whimpled water as the bold old trout sails leisurely up the stream, with his back-fin just peeping above the surface, on the look out for a May-fly for his luxurious repast.

ENGLISH GROWN SILK.

NEARLY all the raw silk used by the manufacturers of Great Britain is imported from China, France, and Italy; but in consequence of the difficulty sometimes experienced in obtaining it in sufficient quantities and of the necessary quality, attempts have been made at different times to breed silkworms and grow the raw materials at home. The most successful experimentalist in this direction was the late Mrs. Whitby, of Newland, in the county of Southampton. So enthusiastic was she in the pursuit of her project, that she imported mulberry-plants from the Philippine islands, and silkworms' eggs from Italy, in order to test the capabilities of the English climate. For more than fourteen years she went on breeding silkworms at Newland's, and winding off their produce, till not only was she convinced that the insects could be profitably reared in England, and that good silk might be produced in sufficient quantities to become commercially valuable, but she had the proud satisfaction of being recognised as the first to introduce a new description of employment into the market.

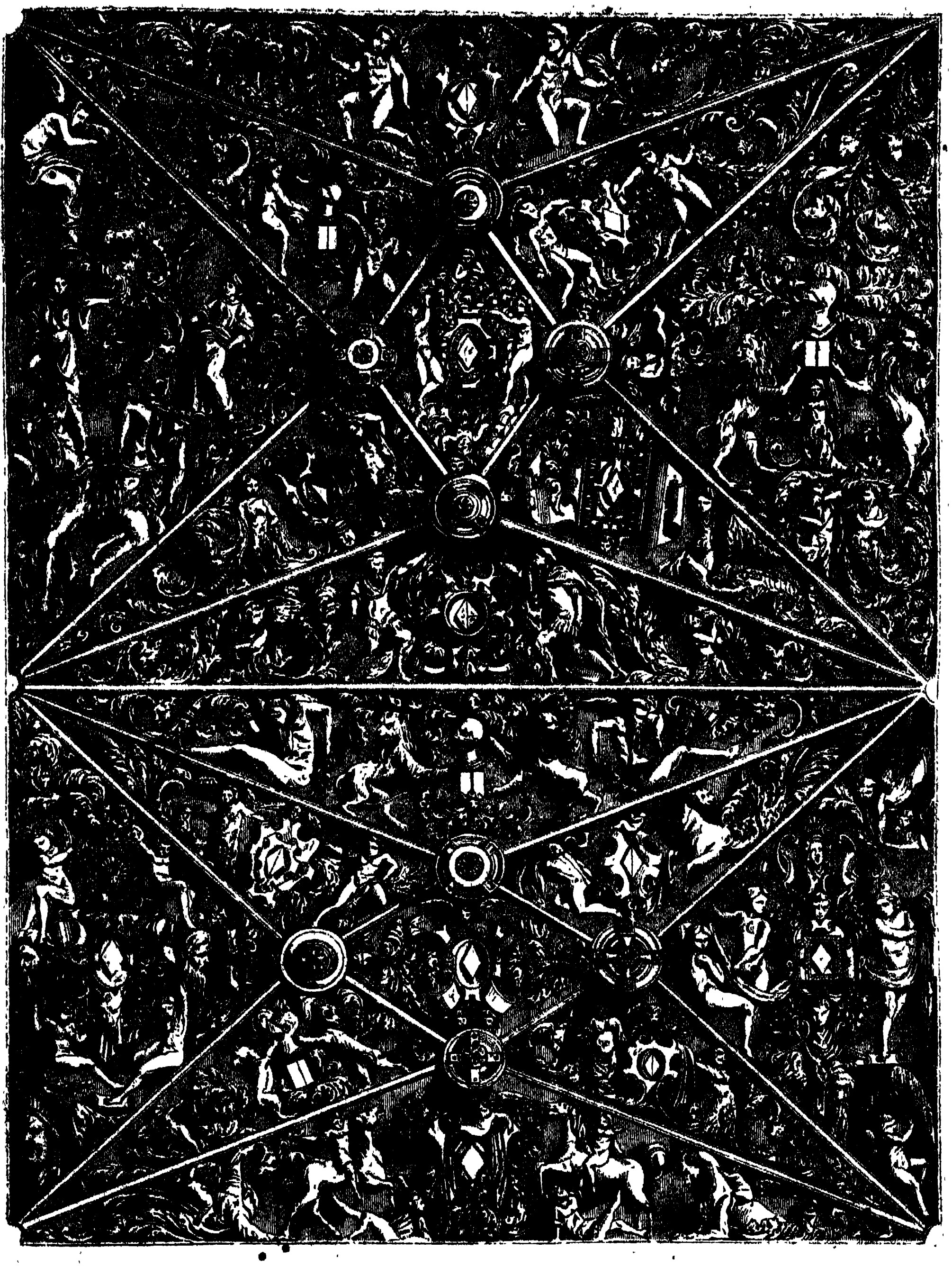
The manner in which she reared the worms and increased the stock of their food is as simple as it is interesting. She commenced her experiments—as far back as 1836—by ascertaining the best variety of mulberry-tree; and that which subsequent experience led her to prefer above all others was the *Morus multicaulis* of the Philippine islands. The luxuriant crop of leaves formed by this variety of tree, and its easy propagation in open grounds, rendered it peculiarly fitted for the purposes; and, with careful training and manuring, the size which the leaf attained in Hampshire almost equalled that of its native country. She found, *too*, that the difficulty hitherto experienced in rearing the silkworm was not near so great as she had anticipated. Equable warmth throughout the period of the insect's existence, cleanliness, classification, and ventilation, with a due regard to the suitability of the food to the age of the insect, she found to be the essential elements of successful management. The silk produced was pronounced by the most eminent manufacturers to be equal in every respect to the best imported from Italy; and Mrs. Whitby, by her own efforts, proved that English-grown silk might be made a profitable undertaking. Unfortunately for the interests of trade, however, this lady died before the manufacturers became fully aware of her valuable labours. Several articles composed of silk grown at Newlands, were shown in the Crystal Palace by Messrs. Houldsworth, of Manchester; and since the Exhibition many attempts have been, and are now being, made, to carry out the original idea of this lady. We lately saw some ladies' dresses and shawls made entirely from English silk.

THE CHURCH OF TILLIÈRES-SUR-AVRE.



PENDANTS AND ORNAMENTS OF THE CEILING GROUPED TOGETHER. DRAWN BY LANCELOT.

TILLIERES is a small town upon the road from Paris to Brest, lying in a valley watered by the Avre. At present it is composed nearly of one long street, presenting no sign of life except on the arrival of the diligence or the carriage of a traveller. Its modern edifices are one or two brass foundries, and sheet-iron manufactories; but its ancient remains are well worthy the attention of all lovers of art and historical reminiscence. These are the ruins of a castle built by Henry I., in 1040, and others more extensive, of a chateau of the eighteenth century, belonging to the Leveneur family, and above all the sculptures in the choir of the church. The porch, which has often been restored, or rather reconstructed, still preserves some characteristics of the style of the twelfth century. The choir, which dates from 1546, is admirable. It is divided into three unequal compartments, and that in which the altar is placed is again subdivided into three parts. The sides are pierced by arched windows with elegant mouldings, and decorated with niches on which the ribs rest which support the ceiling. The above engraving represents the whole extent of the latter, and the other, some of the detached parts.



CEILING OF THE CHOIR. DRAWN BY LANCELOT.

Each of these compartments is enclosed in a large semicircular arch, from the sides of which, two light and highly ornamented nerves verge towards the centre, and is divided into nine triangular panels, with the exception of that in the middle, which has a lozenge form. At the points in which the nerves meet, are reliefs of great richness and variety. Each panel is filled with figures of men and of animals interspersed with graceful foliage, and in the middle of each is a shield bearing the armorial ensigns of the Levoneur family and others connected with it; but the greater number of these are now mutilated or effaced. Our second engraving represents only two of these compartments. One of the panels, that in which the two satyrs are seen with a girdle fastened round them, was restored in the eighteenth century. The whole of the upper part is entirely new, and the difference between ancient and modern modes of decoration is distinctly marked in the character of the ornaments.

In place of foliage springing from the heads of monsters, or luxuriant plumes waving gracefully, or acanthuses with jagged leaves, they have substituted natural flowers in bas-relief scattered here and there, modillions with opposing curves and unconnected outlines.

The chief characteristics of these bas-reliefs are great fineness of execution, slightness of projection, and that softness of contour which distinguishes all the works of Jean Goujon. The designs display great richness, great profusion, and much gracefulness, but no settled plan. Not one of them contains any allusion to fable or history. One group towards the right, and at the lower part of the panel, containing a figure wearing the Phrygian cap or head-dress, and holding in her hand a piece of flowing drapery, appears to have some reference to the Judgment of Paris.

The drawing of the figures is in general meagre, but elegant. Many of the postures are highly wrought and artificial, though vigorous, and thus betray the influence of Italian art; above all, that of the school of Michael Angelo. Upon some of the nerves are cherubs amongst flowers and birds; but our space does not permit us to give all the details in our engraving. The nerves project gently at their base, and are brought very close to one another, so as to form acute angles. The artist has with won deful patience worked designs with the chisel upon every block of the stone. In the recesses, into which the eye can hardly reach, there are a number of beautiful figures of angels, and some very fine groups of fruit and flowers. Four of these voussures are reproduced in our second engraving, in which may be seen some of the most remarkable pendants, as well as various other parts, which could not be introduced into the bird's eye view of the ceiling. They are brought closer together than they are in reality, as no attention is paid in the engraving to perspective, to enable the reader to understand them better and perceive the relief and details.

The execution of all the sculptures displays great knowledge. Viewed from below they seem very delicate, finely chiselled, and well proportioned. But if we get close to them by means of a ladder, they have altogether a different aspect. The legs are slender, the model exaggerated, the necks too long, the heads too flat, and the features too short and snubby. On descending, on the contrary, all the proportions appear true and just. In the niches at each side of the windows are large figures of the prophets and evangelists, well sculptured, and with graceful drapery. The sacristy to the right of the choir is decorated with the same taste and profusion. In one of the corners is a charming piscina, sculptured with great delicacy of finish.

These works of art are supposed to have been executed by the order and at the expense of Cardinal Leveneur, who erected the portico of the cathedral of Evreux, described on a former occasion.

STEAM NAVIGATION.

At a recent sitting of the French Academy of Sciences, M. Arago laid before the members a letter from M. Coulmann, of Hanover, respecting the application of steam power to navigation as early as 1695. The letter states, that the celebrated French engineer *Papin*, being at Cassel in the year 1707, resolved upon putting his theory of steam navigation into practice, and to make an experimental steamboat, that it was actually launched, but that, owing to the spite or awkwardness of the boatmen employed, it went to pieces, to the great disappointment of many who had been much interested in the trial. M. Arago thought it fair to add, that it appeared evident to him, that the idea of using steam as a propelling power for vessels had occurred to Prince Rupert, some years previous to the unsuccessful experiment made by M. Papin.

The origin of steam navigation is, however, supposed to date much earlier than the days of Prince Rupert. There is an old volume published in 1510, which seems to contain the first rude idea of the system, and, in 1543, Blasco de Garay, a Spanish captain, made and tried a steam-vessel in the port of Barcelona, but laid it aside owing to the bigotry of an imperial officer. Solomon de Caus, of Frankfort, is said to have been engaged in its first experiments. This was in 1615, long before the days of Prince Rupert.

In 1736 a patent was granted to Jonathan Hulls, for a machine for carrying vessels against wind and tide, or in a calm. In 1778 Thomas Paine, the celebrated political reformer, proposed, in America, the application of steam to naval purposes. In 1781 the Marquis de Jouffroy constructed one on the Soane; and in 1784 two Americans, Fitch and Rumsey exhibited two boats which were slowly propelled in the water by steam power—an humble beginning of a great system. It was in 1788 that Symington, Miller, and Taylor, applied steam power to work a paddle-wheel; while in the following year they were the first to attain a steamboat speed of seven miles an hour, on the Forth and Clyde canal. It was in 1802 that Symington first drew a heavy load along a canal by steam power. It was in 1807 that a steamboat first plied for traffic from Albany to New York on the Hudson river; this boat, the "Clermont," was constructed by *Fulton*, of about 160 tons burden. It was in 1808 that a steamer first ventured on a coasting voyage, which Stevens made from New York to the Delaware. It was in 1812 that the first passenger steamer plied in Britain; this was Henry Bell's little boat, the "Comet," of only 25 tons burden, and 3-horse power; it carried passengers up and down the Clyde. It was in 1813 that a steamer first made its appearance on the Thames, as a passenger-boat between London and Gravesend; and it was in the same year that a steamer first braved the rough seas of our coasts in a voyage from Glasgow to London. By the year 1818, there were forty-six steamers plying in the twelve rivers—Clyde, Forth, Tay, Trent, Tyne, Humber, Mersey, Yare, Avon, Severn, Orwell, and Thames; and about the same time the steamers in the United States exceeded this number. It was in 1818, too, that the first regular trading over-sea steam navigation commenced, by placing the "Rob Roy" on the Greenock and Belfast route; although the English Channel, the Irish Sea, and the German Ocean, had all been crossed by steam before this date. It was David Napier, of Glasgow, who took the lead in steam navigation between 1818 and 1830, and his cousin Robert who has since taken up this honourable position. It was in 1838 that the problem of transatlantic steaming was effectually solved by the safe voyages of the "Great Western" and the "Sirius;" and in the fourteen years which have subsequently elapsed, the progress of steam navigation has been truly astonishing—little less so than that of its sister-system, the railways.

In 1840 it appears from official documents, there were 987 registered steamers in England, 244 in Scotland, and 79 in Ireland. In 1848-9 there were 1,100, being a collective force of about 92,800-horse power. At the beginning of the present year there were 1,184 steamers plying upon the waters of Great Britain and her dependencies. Not only in England had this increase been seen, in France, the returns in December 1842, showed a total of but 108 commercial steamboats, but the amount has nearly doubled since that time. The same is the case in America. According to the "Altanse Register," there were plying in the United States in June, 1851, the following steam ships and boats:—Upon the ocean and on the Atlantic sea-board, 625 steam-vessels. At the same time upon the rivers and lakes, 765 boats. Total, 1,390; conjoint tonnage, 418,113.

"The empire of the sea," says a recent writer, "no longer resides in wooden walls, but in the power of steam!" There is great truth in the saying; but it is not only when the aggressions of one power excite a partial or general war—it is not only when hostilities have begun, and the world wakes up at the rude alarm of belligerent forces—that the true value of steam navigation is seen. As it floats afar to other lands, and carrying with it the productions of British skill and British industry—as it returns with the works of foreign hands, the results of foreign thoughts, and the productions of a foreign soil—it brings the east and west, and north and south together. It binds nation to nation, man to man, and secures that which it is the aim of the world's philanthropists to win, and the realisation of which will be the world's glory—it makes men learn the lesson of co-operation and of mutual help, and shows the folly of war—that worst of human calamities—and the wisdom, as well as happiness of all which tends to bring about the reign of peace on on earth.

THE AZURE COLOUR OF THE SKY.

To judge from the first impressions of our senses, we might suppose that the heaven above us was an immense vault of blue studded with brilliants; such an opinion, however, will only be retained by the most ignorant of men, though many with some title to understanding have very absurd notions of the sky. Its azure colour is due to the want of perfect transparency in the atmosphere. Were it possible to ascend very high above the surface of the earth, the air would be found much more rarefied, till, if we were to ascend still higher, it would become incapable of assisting in respiration, and at length would no longer exist, when we should have reached the region of pure ether.

The higher the mountains are which we ascend, the lighter does the atmosphere become, and the azure colour of the heavens fainter. And if it were possible to ascend to the regions of pure ether, the blue colour would entirely disappear, the sky would appear black as night; for so do those objects appear which do not reflect the rays of light. Consequently, if the air which surrounds us was as transparent as ether the sky could not appear blue. The air is filled with innumerable minute particles, which when illuminated by the sun receive a motion, in consequence of which new rays are produced; and those particles, of themselves opaque, become visible to us when they are thus illumined. Their colour is blue; hence a forest, which appears green when we are nigh to it, seems to be more and more blue as we recede from it. However pale and subtile are the blue rays of air, so many of them strike upon our eye at the instant, that they produce all the effects of a dark blue.

What has now been advanced may induce us to consider the heavens in a different point of view than we have hitherto done. From it we may conclude that there is not a phenomenon in nature, not even the colour of the sky, in which we do not discover order, utility, and adaptation to some certain end. If green is the most agreeable colour that could be chosen to beautify the earth, the azure of the heavens is no less beautiful and pleasing. How dreadful is the aspect of the heavens when storms rave and tempests lour! But what a beauty and simplicity is seen when it is in a state of serenity and repose! The charms it presents increase as we contemplate it, and we are never weary with the pleasing view; the rejoiced soul raises itself to the Being who has thus adorned the heavens, and swells with gratitude in beholding the evidences of his power displayed in its beauty.

ART-INDUSTRY.

However difficult it may be to draw a clear and determined line between mere practical and artistic manufactures, from the almost innumerable varieties of transition, yet it appears very necessary to regard the principles from a purely aesthetic point of view, at the same time remembering that very great uncertainty even prevails among industrial artists as regards the real definition of Art-Industry, and the boundaries which separate it on one side from mere manufactures, and on the other from the arts.

What are we to understand by Art-Industry? On what grounds, and from what properties does an article take the name of an "Art-Industrial product?" The produce of Art-Industry, it is clear does neither belong entirely to art nor to manufactures, but partakes of the nature of both. This participation is therefore to be defined.

Such product may belong to the manufactures partly through its *real value*—as in gold or silver, by its metallic worth—partly through its *practical utility*. An Art-Industrial object evinces at once its purpose, or becomes a pure work of art as soon as it no longer supplies any want of the civilised world. No less important is its intrinsic worth; for we must not forget that the object when produced in a comparatively valueless material, but at the same time designed in perfect accordance with art, is at once raised from the sphere of industry to that of pure art. For seen from this point of view, no one will question the fact, that under certain circumstances a design executed even in common clay may be of more value than an object manufactured of massive gold. The real worth therefore on one side, and the practical utility on the other, constitute a claim to be classed under the head of Art-Industry. Art, however, belongs to it merely from the artistic form with which it clothes to a certain extent the industrial idea.

All this appears perfectly clear and lucid, as far as we have to do with the determination of the claim of each sphere separately. The great difficulty lies in this—that they cannot in practice be separated, but in spite of their mutual difference, in spite of their opposite positions, and in spite of a natural disinclination to unite, they produce by their conjoint energy, objects, which perfectly combine the peculiarities of each.

It is customary to stigmatise the emancipation of life from the prosaic wants of nature, as "luxury," and to add to this many reproaches, the least of which is, that "luxury" is superfluous and useless. Certainly, if put to the test by the mere wants and indispensable necessaries of life, "luxury" may be called superfluous, but in that case, poetry, the arts, even the united sciences, and everything which raises man above the lowest condition of natural instinct is "luxury."

As far as we are concerned, we freely admit that we regard "luxury"—that is, a poetic refinement of the material wants, the subjection of the earthly to the influence of the arts; in fact, the idealisation of the senses—as one of the greatest benefits of civilisation.

The refinement of civilisation has had a great and noble object in view,—namely, the regeneration of art in its former noble and simple truth. If we glance at costume, we shall see that through all its caprices and apparent eccentricities a slender unbroken thread was woven—a striving for simplicity and grace.

To return again to Art-Industry. The difficulty of determining its boundaries, lies, as we have said, in the difference between the two spheres, to which it equally belongs, and in the absolute necessity of the mutual contradictions being perfectly harmonised. As the Art-Industrial object must on one hand be perfectly capable of a practical utility, and on the other, artistic in shape, we may conclude that the object of Art-Industry is to prepare the way for that idealisation of the senses which we have before mentioned.

The connexion in which the practical object of an Art-Industrial product stands to its artistic form; the harmonic influence which certain styles, or certain artistic ideas and principles are calculated to exercise on the practical utility of the product; the facility with which the artistic form embraces the material, the equality which must be maintained between the two influences, all these are questions which must be taken into consideration to decide the claims of any object to be called Art-Industrial, although they are by no means to be regarded as fixed principles.

The spheres of Art-Industry may, however, be divided into two classes. One, the *symbolical*, which includes all those designs which make use of a simple artistic idea for the production of certain products; the other, the *ornamental*—or arabesque in the most extended acceptation. In the latter we recognise the widest field of Art-Industry. We shall now proceed to give a short explanation of the accompanying designs.

Fig. 1. *A bell-handle*, designed by Robert Kretschmar, of Leipzig. The two figures are of bronze or silver. The small bells which are to be executed in the same metal, serve to hide the crank to which the cord is fastened; this cord may either be a metallic chain or a silken cord.

Figs. 2, 3. *A lamp* with four wicks, with the rosette and hook belonging to it, designed by Wiedemann, of Dresden. This lamp might be executed either in cast-iron or bronze. Below the lamp and forming the bottom is a piece of coloured porcelain or glass, contained in a network of bronze. The conjunction of earths with metals has been much practised by French workmen during the last few years, and it is of no little importance that the artist should turn his attention to the effect produced by such combinations.

Figs. 4, 5. Stopper for a bottle, and handle for a cane. These last require no explanation, excepting that they are designed by Lipsius, of Dresden.

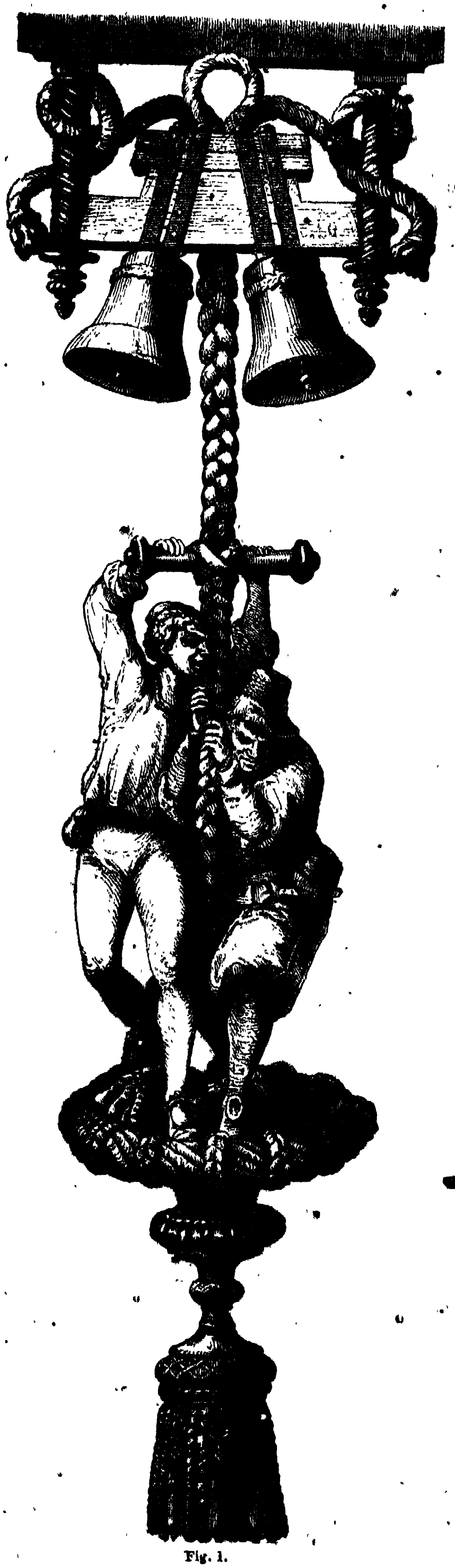


Fig. 1.

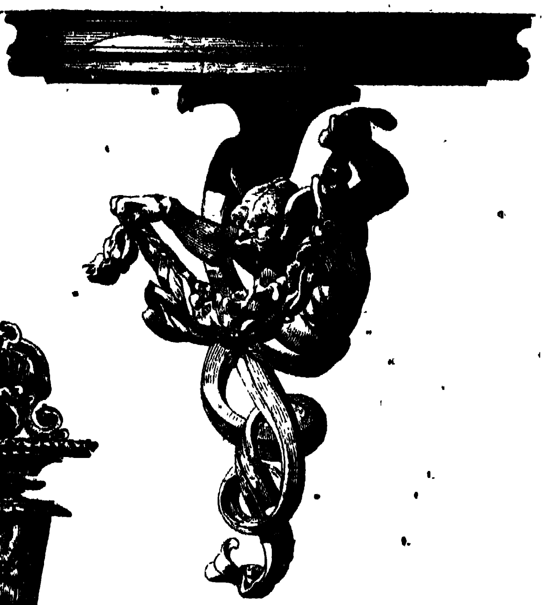


Fig. 2

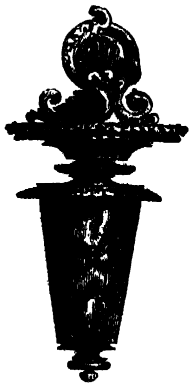


Fig. 4.

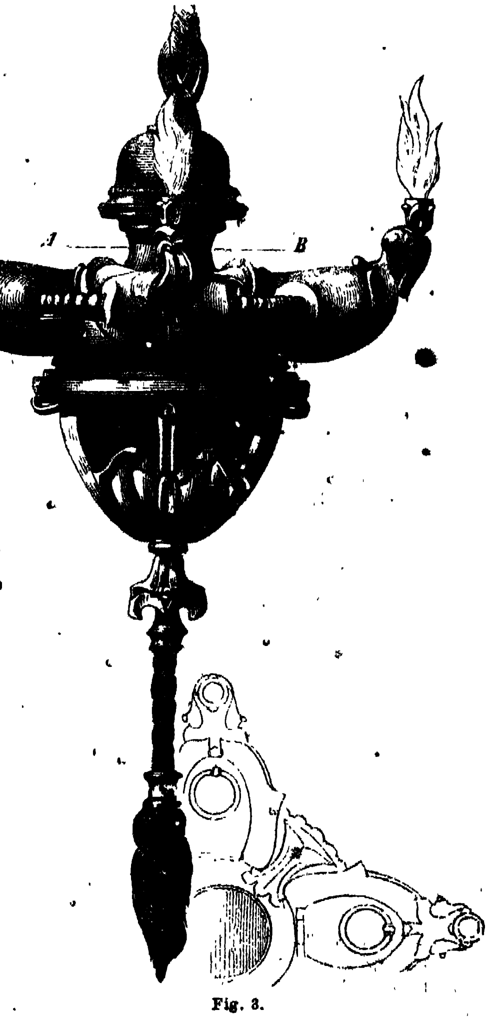


Fig. 3.

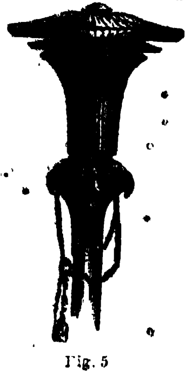


Fig. 5

JAMES TAYLOR, OF BIRMINGHAM.

JAMES TAYLOR, JUN., ESQ. DRAWN BY H. ANELAY. ENGRAVED BY HENRY LINTON.

One of the most striking characteristics of the industrial spirit of the age is its tendency to bring talent in humble life under the notice of the public, and the great stimulus which it has consequently given to self-education. The collection of large masses of men in the busy centres of manufacture has many undeniable disadvantages; but it unquestionably sharpens the intellect, calls forth powers of mind, and creates a solidity of judgment which are rarely found amongst those engaged in agricultural pursuits. It has been well said, that from the shock of ideas springs truth. Constant intercourse with great numbers of our fellows, contact with great numbers of strangers and personal interest in the success of enterprises which have the wide world as a field of action lead the artisans in the great factories of Birmingham, Manchester, and other large towns, to look beyond the gratification of the selfish wants of the hour, and become absorbed in the contemplation of the vast extent of inquiry and knowledge which lies even within their own horizon. It is in these busy hives of industry that some of the great social and economic problems of the day must be solved; and, let others say what they will, it is the working men who must solve them. Reading, which is sought as a relief after the fatiguing duties of the day, leads to discussion, and this, when temperately and soberly conducted teaches men to measure themselves against their fellows, and shows them exactly what is their mental calibre. Consciousness of the capability of rising in the social scale awakens to the desire to do so; and perseverance in self-improvement invariably brings about the wished-for result.

It is our intention from time to time to give portraits of some of these self-made men, and a sketch containing the leading incidents in their lives. We commence with that of James Taylor, of Birmingham, who is at present well known as one of the chief promoters of the Freehold Land movement. He was born in Birmingham in 1814, and is now consequently thirty-eight years of age. His father was a tradesman of that town, and gave his children as good an education as his scanty means would allow. James was set to work at an early age, and was in due time bound an apprentice to one of the fancy trades. While thus situated he was distinguished by his industry and frugality. At the age of twenty-one he married, and soon after, the trade fell off greatly and he became addicted to drinking, which for five years prostrated his energies, and kept himself and his family in misery. At the end of that period, however, he signed the total abstinence pledge, and thus commenced a new era in his life. His upward progress from this time was rapid. He became a great temperance advocate, and appeared at innumerable meetings held in aid of that cause. He at length had his attention drawn to the Freehold Land question, as a means of placing the franchise in the hands of the labouring classes, and thus giving them their due influence in the government of the country, and has filled various offices in connexion with benefit, and similar societies of his native town. He was the originator of the idea upon which the Freehold Land Societies are founded, and persevered in carrying out his plan in spite of the obloquy heaped upon him from all sides, and we need hardly allude to the success which has crowned his labours. The Wolverhampton Freehold Land Society in 1848 presented him with a gold watch, as a testimony of the high sense they entertained of his services in the cause. On this occasion a meeting was held in the theatre, at which four hundred shares were purchased.

Our readers may ask what is the Freehold Land Movement. We will tell them as briefly as we can. It is a new name for the development of an old idea. Our constitution, as we are all aware, is a very old one, and amongst its oldest principles is one which Mr. Taylor has taken and worked with wonderful success. According to our old English constitution every forty-shilling freeholder has the right to the franchise. Mr. Taylor, then, by means of the associative principle, offers that right on the lowest terms to every man who likes to secure it for himself. And he does this in the following manner:—A society is formed of members subscribing a shilling a week; if several hundred members are enrolled, in time these weekly shillings amount to a very respectable sum, and when this is the case—or before if, as it generally does happen, the society can borrow it—an estate is bought, which is allotted amongst the members. The advantage of this mode of procedure is that the estate is bought wholesale, and divided at wholesale price; and the thing being thus done the law expenses are greatly curtailed: and a small plot of ground, which is generally a very costly article, is thus supplied to the purchaser at generally about half the price which he could otherwise have obtained it for. But our readers may tell us, this is the old scheme of Feargus O'Connor over again. We reply it is nothing of the sort. His land society was quite a different thing. He sought to make agricultural labourers and small proprietors of men who knew nothing about land, who were utterly unfit for their work, who were as qualified for rural employment as they were for service on board a man-of-war. The societies with which Mr. Taylor is identified aim at nothing of the kind. They do not take the workman from his regular employment. They simply offer him a means of saving a little money, of becoming the proprietor of his own house, of having a stake in the country, and a voice in the management of its affairs. When we remember how deep-seated is the attachment to the possession of land, we cannot wonder these societies have prospered as they have. Nor, especially can we wonder at this, when we see how few are the investments for working men, and how unsatisfactory is the condition in which most of the savings-banks are at present. Our readers must not, then, be surprised to learn that almost every town in England has its freehold land society, that their numbers vary from 150 to nearly 10,000 members, as in the case of the National Society, and that they are patronised by parties of all shades of political and religious opinion. There is a Church of England Freehold Land Society, for the special benefit of members of the Established Church; and, if the dissenters have not a society with a distinctive name, it is not that they do not take equal interest in the movement, but from the simple fact that they are connected with societies already existing. Some time back the *Times* wished to see the inside of a Freehold Land Society. We have now suffered our readers to do so. The thing is very simple and clear. They are based upon the associative principle—upon that truth so well known and acted on at the present day, that numbers can do what individuals cannot.

James Taylor is now living with his family in Birmingham, in a pretty little residence which he has named "Temperance Cottage." He has been the author of various pieces in prose and verse, which have found their way into the provincial newspapers. Though good offers have been held out to him, in case he chose to settle in London, his attachment to his native town is so great that he would never consent to leave it. Our engraving is considered a striking likeness of James Taylor. We have transferred it to our pages by an arrangement with the proprietor of *The Freeholder*, a Saturday newspaper, the organ of the Freehold Land Movement, to the subscribers of which journal it has already been presented.

METEORIC SHOWERS.

One of the most splendid displays of this phenomenon which we have seen on record took place in the month of November, 1846. The chief scene of the exhibition was included within the limits of the longitude of 61 deg. in the Atlantic ocean, and that of 100 deg. in Central Mexico, and from the North American lakes to the West Indies. Over this wide area an appearance presented itself far surpassing in grandeur the most imposing artificial fireworks. An incessant display of dazzlingly brilliant luminosities was kept up in the heavens for several hours. Some of them were of considerable magnitude and peculiar form. One of large size remained for some time almost stationary in the zenith, over the falls of Niagara, emitting streams of light. The wild dash of the waters, as contrasted with the fiery uproar above them, formed a scene of unequalled sublimity. In many districts the mass of the population were terror-struck, and the more enlightened were awed at contemplating so vivid a picture of the Apocalyptic image—that of "the stars of heaven falling to the earth, even as a fig-tree casting her untimely figs when she is shaken of a mighty wind." A planter of South Carolina thus describes the effect of the scene on some ignorant negroes:—"I was suddenly awakened by the most distressing cries that ever fell on my ears. Shrieks of horror and cries for mercy I could hear from most of the negroes of three plantations, amounting in all to about six or eight hundred. While earnestly listening for the cause, I heard a faint voice near the door calling my name. I arose, and taking my sword, stood at the door. At this moment I heard the same voice still beseeching me to rise, and saying, 'Oh, sir, the world is on fire!' I then opene the door, and it is difficult to say which excited me most, th awfulness of the scenes, or the distressed cries of the negroe Upwards of one hundred lay prostrate on the ground—so speechless, and some with the bitterest cries, but with th hands raised, and imploring God to save the world and the The scene was truly awful, for never did rain fall much thic than the meteors fell towards the earth; east, west, north, and south, it was the same."

This extraordinary spectacle commenced a little before midnight, and reached its height between four and six o'clock in the morning. The night was remarkably fine. Not a cloud obscured the firmament. Upon attentive observation, the materials of the shower were found to exhibit three distinct varieties:—

1. Phosphoric lines formed one class, apparently described by a point; these were the most abundant. They passed along the sky with immense velocity, as numerous as the flakes of a sharp snow-storm.

2. Large fire-balls formed another constituent of the scene. These darted forth at intervals along the arch of the sky, describing an arc of 30° or 40° in a few seconds. Luminous trains marked their path, which remained in view for a number of minutes, and in some cases for half an hour or more. The trains were commonly white, but the various prismatic colours occasionally appeared, vividly, and beautifully displayed. Some of these fire-balls, or shooting stars, were of enormous size. Dr. Smith, of North Carolina, observed one which appeared larger than the full moon at the horizon. "I was startled," he remarks, "by the splendid light in which the surrounding scene was exhibited, rendering even small objects quite visible." The same, or a similar luminous body, seen at Newhaven, passed off in a north-westerly direction, and exploded near the star Capella.

3. Another class consisted of luminosities of irregular form, which remained nearly stationary for a considerable time, like the one that gleamed aloft over the Niagara Falls. The remarkable circumstance was justified by every witness, that all the luminous bodies, without a single exception, moved in lines, which converged in one and the same point of the heavens, a little to the north-east of the zenith.

GOLD IN CALIFORNIA AND AUSTRALIA.

The piece of gold which our engraving represents weighs upwards of forty-two ounces. Its component parts have been calculated as follows, the gold being almost pure:—

Gold	823·5
Silver	178·5
Copper	8·0
	1,000·0

This remarkable specimen of Californian gold was found on the banks of the Juba by an Irish sailor, who had deserted his vessel for the gold-mines. Pieces of gold of this size and purity are very scarce, but several have even been met with which far exceed this both in value and dimensions. The discovery of the Californian gold-mines produced but little effect in the masses of population in England, and though it was prophesied that such immense discoveries of gold must produce great depression in the value of that metal, yet up to the present time, though the importation is as large as ever, scarcely any such effect has been experienced in this country or America. In the United States the gold fever was all powerful; but in England it was but little felt; in America men of all ranks, and every profession or trade, threw up their occupations and left for the Placers of the Sacramento on the Juba. Immense fortunes have been made in many instances, but thousands who went elated with hope have returned disappointed, with injured constitutions and ruined prospects. This may be ascribed to several causes. The gold of California attracted those legions of outlawed Americans, who either through impatience of the yoke of society, or through their own crimes, have been compelled to push on as the lawless and daring pioneers of the great Anglo-American race. The constant scenes of murder and consequent lynch law, the robberies and Indian massacres which were reported in the Californian newspapers, clearly showed the state of society in that country. Another cause was the climate, which is one of the most unpleasant and unhealthy in the American continent. At San Francisco in one day the four seasons may be experienced; damp fogs in the morning, a stifling heat at midday, a violent gale in the afternoon, and sharp frost at night. Very few constitutions are able to stand such changes even when guarded by every domestic and social comfort, but how much more trying must they be to any one who is exposed to their influence at the Placers; he must stand up to his knees in the water while washing the sand and earth from the golden grains, sleep on the ground, and expose himself without hesitation to the inclemency and change of the elements. In California the usual gains of a miner were from £2 5s. to £2 10s. per diem, out of which he would have to expend from six to ten shillings for food. Some cases have been known where miners have been obliged to part with every grain of gold to maintain life. These facts, with the great distance and uncertain voyage, prevented any great emigration from Great Britain, though, without doubt, some adventurous spirits were impelled by the fever to try their fortunes on the Sacramento.

As regards the cry of approaching depression in the value of gold, we may refer to a statement of the amount of gold procured annually before the discovery of the Californian mines, stating, at the same time, that for seven or eight years the Ural mines have afforded upwards of twenty millions, without having produced any visible alteration.—

Europe (excepting Russia) . .	£200,000
Siberia	4,000,000
Asia (excepting Siberia) . . .	100,000
North America	200,000
Africa	400,000
South America	1,200,000
	£6,400,000

To all appearance, were this sum doubled, or even trebled, it would produce no other change than that of the substitution of gold for silver money.

Wonderful as were the accounts from California, they have been completely thrown into the background by the late reports from Australia. The most wonderful and almost incredible accounts were put in circulation, but however wild and unfounded many may have been, there are yet others which are perfectly true as regards facts. For many years reports had been current that the Australian Alps and the Snowy Mountains were full of gold; but it was not till after the Californian discoveries that any was found in Australia. Two shepherds were the first persons who found any gold, and for a long time they successfully concealed the source from which they procured it; but being watched, their secret was discovered, and the news spread like wild-fire over the colony. Scales appeared to fall from people's eyes. They must have before been blind, for gold was found everywhere. In one place a large stone, which, from the fact that bush-rangers had near it planned their robberies, called Bush Rangers' Rock, was found to be full of gold, to the amount of near £4,000. Gold quartz was even picked up from among the stones with which roads had been repaired, and a bridge was even pulled down, as it was found to have been constructed of auriferous stone. Many of the causes which in California prevented emigration did not exist here. The system of licensing the miners has been of great service in preserving order, and, as a specimen of the good feeling existing at the "diggins," we may mention that the last accounts state that most of the farm labourers have returned to assist their former masters in getting in the crops. The gold at Sydney is found embedded in quartz, and is, therefore, much harder to get than in Victoria, at the Mount Alexander, and Ballarat diggings, where the "nuggets" are found embedded in a blue clay at a depth varying from three to twenty feet below the surface. The climate of Victoria is described as being splendid, and provisions are not much scarcer than they were previously. Melbourne is, of course, almost deserted, and several cases have been mentioned where families have been entirely left without servants. A groom informed his master, in one instance, that he would stop with him, as he had been in the family for five years, for a guinea a day, if it would be any convenience to him! Another family were left with only a boy of sixteen to attend them, and his stipulations were—two pounds a week, and wine to his dinner!

All accounts tend to confirm the fact that gold is almost inexhaustible, and that the *fields* extend for hundreds of miles into the Snowy Mountains. The probable annual export of gold, calculating from the present arrivals at Melbourne, will be upwards of £3,000,000, and on December 5th the following quantities of gold were received by the escorts :—

	oz.	dwts.
Melbourne	19	10
Goulburn	41	0
Braidwood	301	10
	oz. 362	0

Calculating with the price of gold at £3, the amount discovered in Australia during the three months ending December, is £730,242. The following is an extract from a letter written by Councillor Guthridge, from the diggings. The writer is known in the colony as a man whose "word is his bond."—

"Believing many of the reports put in circulation to be grossly exaggerated, I was the more careful from personal observation and minute inquiries, to arrive as near the truth as possible, the result of which is, that although individual cases of success may have been swelled in the relation, yet in the aggregate, the most extravagant statements which I have heard, have rather fallen short of the facts than exaggerated them. That gold is being dug up there in immense quantities is an established fact. That a very considerable number of the diggers are realising fortunes is beyond doubt; that multitudes are doing what is termed "very well" is quite certain; that almost everybody who works is getting something is plain, and that gold exists in abundance, not only in the neighbourhood of the present diggings, but through the whole of the ranges along the banks of the Loddon, Colliban and Campaspie rivers, which is all but inexhaustible. I verily believe that no one need be afraid of being *too late*, for generations yet unborn will doubtless be digging gold from those ranges, if indeed it remain of sufficient value to be dug. I will mention a few cases of success which came under my own observation. A person named Hill, who had been at work only seven days, placed in my hands his leather bag, the weight of which I judged to be 27½ lb.; this was his share of the spoil. Another man, a carpenter, whom I knew in Melbourne, told me his gold had been sold, and realised £1,340. I met Mr. Hyde, the corporation overseer, on last Friday morning, about 8 o'clock. He and his party had arrived on the previous day, and commenced work in the afternoon; he showed me the produce of their labour during the few hours which they had been at work, and I believe it could not have been less than a pound and a half. One party, several members of which I am intimately acquainted with, but am not at liberty to name, as they are preparing to come down by the end of this week, and wish to take a start of their friends, assured me that during last week alone they had *half a hundredweight*, besides a large quantity realised previously, and, as the vein still continued good, they expected this week would add largely to the stock.

* * * * *

It is not true that there is a stream of water running near the commissioner's camp, nor yet in any other part of the present diggings; but the water is neither so scarce nor so bad as I expected to find it, nor are public morals so low as I anticipated. I saw none and heard of very few instances of improper conduct. The Rev. Mr. Harcourt preached on the ground on Sunday last to a large congregation. Several ministers could be well employed constantly on the field. I estimate the number of persons including women and children at 20,000. Stores are abundant, and most goods are to be bought there as low as in Melbourne."

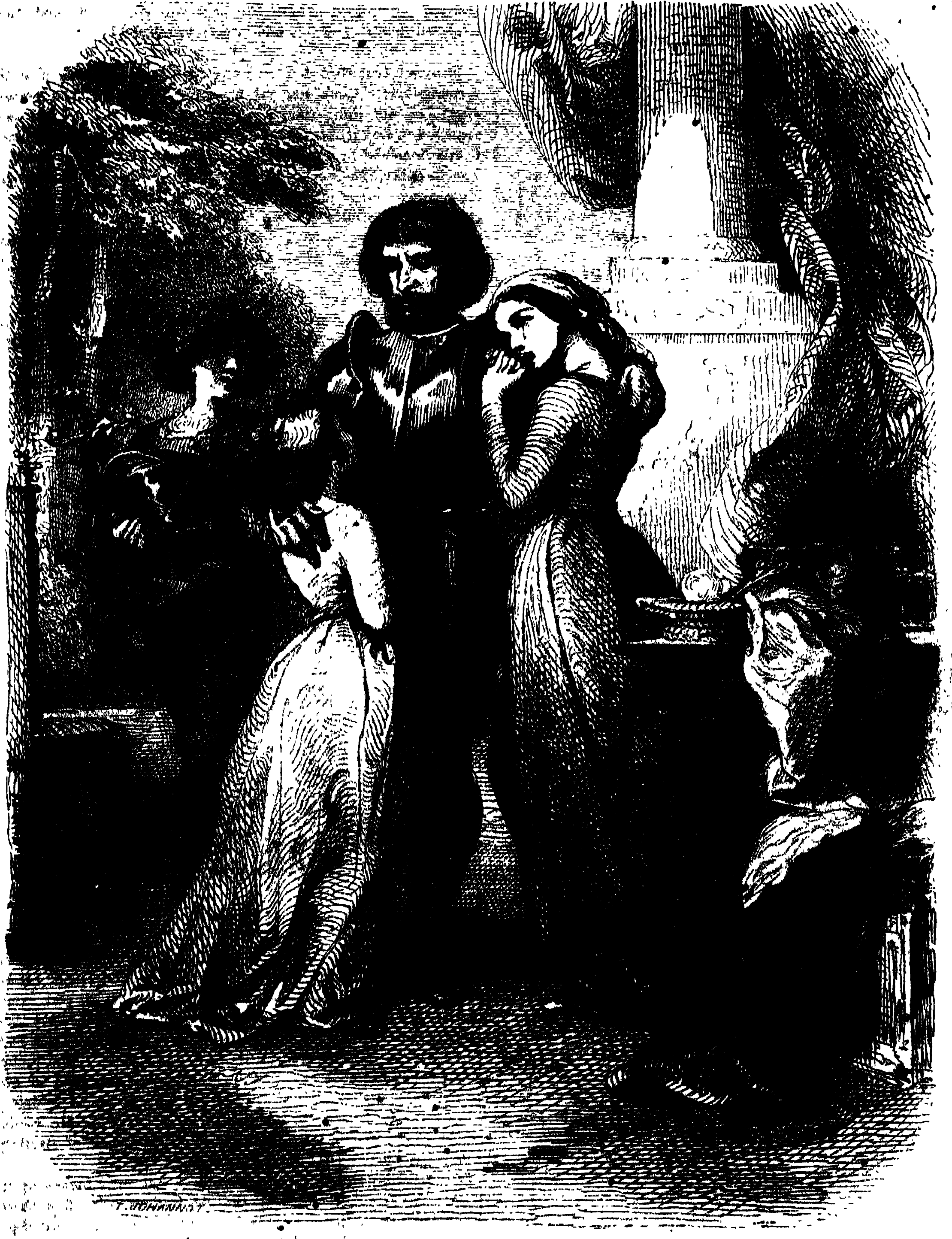
The following shows the manner in which the gold is found :—

"The heaviest nugget, or lump of solid gold, yet found in the colony, was brought down from the Turon, and purchased by Mr. George A. Lloyd. It weighs *seven pounds*, and contains only a few specks of quartz. This seven-pound piece was found by a man named Thomas Treleaver, a miller, lately in the employ of Mr. T. W. Smart. He went out prospecting, and on the banks of the Turon, about eight inches from the surface, his pick came in contact with this splendid treasure, which was embedded like a wedge between two solid pieces of quartz, seeming as if it had found its way into this receptacle in a liquid state. The lucky finder, trembling with his good fortune, thrust the gold in his red nightcap, and made the best of his way down to Sydney, where he arrived, and sold his treasure to Mr. Lloyd. He would not reveal the precise *locale*, but stated his intention of starting back to the lucky spot with all despatch."

In the colony this discovery of gold is naturally looked upon as an "unmitigated evil" by the old settlers, who find their establishments broken up, their servants deserting to the diggings, and their flocks and herds left untended in the boundless forests and plains of the interior; but that the discovery will, in the end, be of infinite value to Australia, cannot be doubted. Emigration will be directed there; another great English empire will rise on the Australian continent, and an unlimited market opened to our manufactures. Many years must, necessarily, pass over before this takes place; the disorganised society must gradually return to a settled state, and to time must be left the task of solving the "*great gold question.*"

PIECE OF CALIFORNIAN GOLD.

THE FOUR AGES; FROM DESIGNS BY T. JOHANNOT.



III.—MANHOOD.

The artist has symbolised manhood in the person of an iron-clad soldier, taking leave of his weeping family, because in war, more than in any other pursuit of life, the masculine qualities, of skill, courage, coolness, strength, and judgment are all brought into play. Intellect and physical force put forth all their powers; but the passions are abused. And in the rude and semi-barbarous ages, to which art ever loves to recur, the valorous soldier was considered the embodiment of all that was glorious in action, and pure and graceful in private life. It is true that facts did not always support this pleasing theory. Coarseness and brutality too often went hand in hand with the genius of war, and he who was unnerved at seeing the parting tears of his own wife and daughters, too often had but little pity for those of others. But the standard which chivalry set up was a lofty and noble one, and we can hardly wonder that poets and painters love to copy it. Bayard, the *chevalier sans peur et sans reproche*, was perhaps the only knight of the middle ages who nearly resembled this model, and who, whether on tented field or in the halls of council, or in the society of the fair sex, was still heroic, disinterested, simple, frank, and truthful. He was the beau ideal of manhood in its prime, dreaming

> " Of basilisks, cannon, culverin,
> Of prisoners' ransom, and of soldier's slain,
> And all the currents of a heady fight."

The battle-field was then the only one on which man could play a distinguished part. The thousand paths to fame, fortune, and usefulness which now lie open to every youth were then unknown. Men's name and memory, and their powers for good or evil were watched over by the sword alone. Stern determination, backed up by brute force, now belong to the past; at least they are not considered indispensable requisites in the formation of a great character. But art loves the past. How many times in the long roll of ages has the scene our engraving describes again and again recurred, from the time when Andromache fell upon the neck of her lord, and implored him not to face the swift-footed Achilles, down to the parting of Hotspur and Lady Kate, when he made the "crop-eared roan his throne," and rode fiercely to the onslaught!

But now how changed! How many other pursuits are opened up, as honourable, as full of distinction and reward, and *more* useful than that of arms; how much higher our objects and ambition, when on emerging from youth we find ourselves engaged in the actions and interests of the world, with increased strength of faculty and purpose. It is in manhood that the real history of life begins, and that we see the mighty works that our fellows have done, and thence learn what we ourselves are capable of achieving. To see man in his glory and prime, we must not now go seek him in the field of carnage only, but everywhere,—in the courts, in the legislature, on the sea, in the counting-house, on the platform, in the pulpit, and last of all at home. Gain what triumphs he may elsewhere, fortune in business, applause among nations, favour with rulers, love among the people, a name to last in literature, admiration in the senate, glory in the field,—if his inward and his near life are barren or bad, he is unhappy, and though the splendour of the circumstances by which he is surrounded conceal the malady, they cannot cure it.

Youth is of the future; maturity, of the future and past; childhood has nothing but the present, and age, nothing but the past. Manhood is the period of action, for the strength and intellect are now in their prime. New sensations, fresh impulses, quick alternations of desire, rapid emotions, intense passions, plans, projects, enterprises, are not for the dim eye, the deaf ear, the rigid nerve, the sluggish blood, and the conservative habits of intellect and opinion which both the mental and physical influence of age tend to consolidate. In manhood, our struggles with desire have in a great measure passed by, and we are now reaping the fruits of our triumph. We have attained to the calm and bright spots, from which, as we look back, we rejoice over our early efforts. We perceive how dismal, perplexed, and dark, our lot might have been, had we instead of resisting passion, resisted duty. The resistance, it is true, cost us pain. We gave ourselves to solitude and study, which many a time the soul revolted against as hateful drudgery. We denied ourselves the field and the shady wood, when our hearts leaped to enjoy them. Lessons ceased to be tasks, and in time they became knowledge, and knowledge made us wise All the victories, in science, art, or learning, that the greatest men have ever achieved, have been but so many triumphs over opposing inclination, and strength thus acquired goes on accumulating from day to day, till in manhood, it reaches its climax. See what it has done. How many mighty works, that will last as long as time, were composed amidst the distractions of adversity, or under physical or mental suffering, or in the damp vaults of a dungeon! Manhood is the perfection, the fulness of life. The life we now live is in the flesh, and it must be essentially practical, and not one of mere sentiment, or thought, however grand the thought, or generous the sentiment. The path which leads to the mount of rest does not lie among flowers; and he who travels it must climb the cold hillside, must have his feet cut by the pointed rocks, must faint in the valley, and often rest at midnight in the sandy desert. It is no small thing for which the true man strives; and whether cased in steel for the armed encounter, or bent on the nobler mission of elevating the people and alleviating the ills of humanity, he must be deaf to the imploring accents, and unmoved by the hot tears of those who love him when the voice of duty calls him away.

THE DIAMANTOID, OR ROUGH DIAMOND.

The diamantoid is a kind of stone recently discovered in Bengal, and now used by most lapidaries in polishing precious stones, instead of diamond dust. It has all the physical properties of the diamond, except the crystalline appearance,—the same specific gravity, and the same hardness, and will scratch any other body, although no other substance can scratch it. It exhibits the same chemical reactions, whether in a moist or dry state, that is to say, it is insoluble in acids. Having been burnt in pure oxygen, by the same means as are employed to produce combustion of the diamond, it only gives carbonic acid, with a very small residue of ashes, supposed to be produced by the presence of foreign matter. Its chemical composition then, as well as its physical constitution, is identical with that of the diamond. But as it is not crystalline, it wants the glitter and limpid appearance which give precious stones so much of their value.

The diamantoid is found in large shapeless masses, the corners of which appear battered by constant friction, but not rounded off like pebbles. These lumps are rather rough on the outside, and are of a black or brownish colour, generally very dull; sometimes, however, they shine like graphite. They break in unequal parts, and when examined with a microscope, display a great number of minute cavities, separated by irregular plates slightly translucid, reflecting the solar rays in a great variety of colours. Their size is variable.

We do not yet know the precise manner, or the exact locality in which the diamantoid is found; some say in the same alluvial deposits as the diamond; and as its age is not known, neither is its origin. This would doubtless furnish an interesting subject of study to the geologist. It is more than probable, however, that it has been formed under the same circumstances as the diamond. In this case, it would, as geologists say, have been created by the transformation by caloric, or by electro-chemical currents of organic carbonaceous matter, buried in the rocks where it is found. But the diamantoid must have been subjected to this agency in a less degree, as it wants crystallisation. Its molecular formation is intermediate between the perfectly crystallised carbon, and amorphous carbon, such as coke and charcoal, forming a connecting link on the one side between the black diamond and the graphite, and on the other approaching the anthracite, the most stony, if we may use the expression, of carbonaceous minerals, and the origin of which is well known.

Whatever may be the value, however, of these scientific investigations, the discovery of the diamantoid is a fortunate one for the lapidary. Like the diamond it is the hardest of all bodies, and answers the same purposes in the arts and industry.

INDUSTRIAL EXHIBITION AT CORK.

It may seem a matter for surprise that, notwithstanding all that has been said and done within the last few years with the view of ameliorating the material condition of the Irish people, they should still seem to set at nought all the efforts made to retain them, and continue to fly across the Atlantic every year in increasing numbers. There are two reasons for this;—one is, that there has been during the whole of the last half-century such a prodigious deal of talk which has led to no practical result, that faith in speculations has almost died out amongst the lower classes, and nothing short of immense success, and tangible returns, will ever be sufficient to revive it. Another is,—the undue interference which the government or its agents have in past times been accustomed to exercise in almost every department of industry, encouraging particular branches of manufacture, and doing all in their power to put down others, until the people have got to believe that there was nothing true, real, and lasting but potatoes, and to the potatoes they stick with an energy and determination worthy of a better cause. When these failed, everything went wrong, and the consternation was as great as would have been produced amongst the ancient Romans, had they got up some fine morning, and found the Coliseum prone in the dust. People in England now thought this was a capital opportunity for changing the whole face of the country, by relieving the population, and at the same time promoting useful public works. But the government would not lend the money to private individuals, and let them follow their own course. It lent it to Baronies, and Committees, and Road Sessions; and the Baronies, and Committees, and the Road Sessions, fell upon it like wolves upon a dead carcass, and swallowed it up, leaving not a trace behind, but long white tracts of uptorn earth, like huge bones bleaching in the wind, which were intended to be roads, but which for want of funds are left half-finished.

When the country began to recover, however, and the Encumbered Estate Court had thrown the wretchedly-managed estates of the old proprietors into the hands of enterprising capitalists, industry began to raise its head. But it has had formidable difficulties to contend against. To carry on manufactures of any kind on a large scale, skilled, trained labourers are required. In Ireland these can hardly be said to exist. The great mass of the population is entirely devoted to agricultural pursuits, and even these operations are conducted in a rude and unscientific manner. The manufacturer, then, had a double difficulty to encounter; not only should he erect buildings and import machinery, but he had to take his workers from the plough, and render horny hands capable of performing the manipulations in processes which require a greater or less amount of skill, experience, or delicacy of touch. But this has nevertheless been overcome, and so rapid has been the progress made in art and industry during the last few years, that it has been determined to have an industrial exhibition at Cork, to be made up in the main of native contributions. There has been amongst its promoters more fishing for patronage, and applications for great names, to stick on paper like the subscription-list of a charity, than we like to see. This denotes the existence of some of that spirit of dependence upon the aid of others which has so long been the curse of Ireland, but which will no doubt in time wear out. But still it is a step in the right direction, and we have no hesitation in saying that it is to Sir Robert Kane that most of this progress is due. He it was, who first made the people acquainted with the advantages of their position, and the untold wealth that lay hidden in the bogs, bays, rivers, and mountains. In his "Industrial Resources of Ireland," he first made us aware that in the Connaught mountains there are iron-fields unequalled by any in the world for richness and easiness of access; that the peat by being compressed by a simple and cheap process answers all the purposes of coal and coke and charcoal for working steam-engines or smelting iron ore, that there was water-power enough in Ireland to work all the mills in the kingdom, and fish enough on the coasts to feed all the artisans that might enter them; and that the climate and soil were admirably adapted to the growth of flax and the production of wool. His work made a great sensation, although every fact it contained had been patent for two hundred years. People then began to bestir themselves. The government established schools of design in Cork, Belfast, and Dublin. These have been admirably attended, and the progress of the pupils has been rapid and gratifying. Efforts have been made, with considerable success, to introduce the manufacture of lace amongst the female poor. In industrial schools established in Belfast and Dublin, and managed entirely by ladies, this has been already done with considerable success. To convey some idea to the reader's mind of the difficulties they have had to encounter, we may mention that when the project was first thought of, the committee of management of the industrial school in Belfast endeavoured to procure the services of a Belgian girl to instruct their pupils, as in Belgium the manufacture of lace is very extensively carried on as a branch of household industry. Not one could for a long time be induced to come, even by offers of high wages. They were willing enough to come to England, but not to Ireland, which they believed to be in little better state than California. Whether their apprehensions have been dissipated by this time, we are unable to say.

One very important object which the Cork Exhibition will go far to accomplish, is the diffusion of information amongst the people of each district as to the produce and manufactures of the others. The railways now afford such facilities for travelling in the south of Ireland, that, if the directors act in a liberal spirit, we have no doubt that there is not a peasant or small farmer in the province of Munster who will not visit it. Not one of these was able to come to London in 1851, and the Cork exposition will have for them as great a charm as its great prototype had for the upper classes; and it will doubtless afford them a greater amount of instruction, because being necessarily on a small scale the objects can be examined in detail. The linen manufacture has flourished in the north for many years. The splendid array of muslins, diapers, table-cloths, &c., which were collected in the Linen-hall at Belfast on the occasion of her Majesty's visit, astonished and delighted every one who saw them. The trade is increasing every month, and the manufacturers are gaining a footing in every market of the world, in many places superseding the French cambrics, which have been so long unrivalled. But strange to say, every attempt to introduce the growth of flax in the south has hitherto been a failure. Whether from ignorance of the mode of culture and preparation, or from unwillingness to abandon old courses, the farmers would have none of it. But was it shown them in every stage from the earliest blossom to the finely-spun fabric, and a practical statement of its profits and advantages thus placed before their eyes, there can be little doubt they would return to their homes with new ideas and renewed hopes.

There would be also gloves and lace from Limerick, displaying taste, delicacy, and finish of workmanship, which reflect as much honour on the "city of the broken treaty" as its heroic defence in 1689; peat, iron-ore, and woollen stockings from Connemara, showing us rather what may be done in the west, than gratifying us by what is done. If the nomade tribes of this fine, but neglected, district can but support life during the present crisis, they may yet attain to a degree of prosperity of which they never dreamt. They must remain in the country at all events, for they cannot obtain the means of going to America. The Beetroot Sugar Company, who have established their factory at Mount Mellick, in the Queen's County, and are, we are glad to say, progressing rapidly, having found plenty of active and docile workmen amongst the peasantry of the neighbourhood, will be able to send some of the best specimens of their sugar, as well as illustrations of the various processes of the manufacture. Here is another prospect for the Munster farmer. This company complains chiefly of not being able to find a sufficient supply of beet-root, and offer to purchase all that may be grown, at a rate which would prove highly remunerative to the consumer. But who that knows Ireland, does not know that none but the people in the immediate neighbourhood know anything about this? But if the Tipperary men visit the exhibition they will see and learn all about it, and find that the railway which passes their doors will deposit their produce at Athy, within a few miles of the factory, and bring them back more money for an acre of beet, than the potato in its palmiest days ever did,—more money, because it will inculcate habits of painstaking industry which no potato cultivator ever had or could have; because the potato being a good-natured root, does everything for itself, and lets its owner take his ease. And we have no doubt that the gentry and the various societies, and schools of design in Cork and elsewhere, will contribute their works of art, paintings, models, casts, curious relics of antiquity (of which Ireland contains, perhaps as many as any country in Europe), and the college will contribute its learning, in illustration and explanation of the whole. A powerful stimulus would thus be given to the material progress of the country, and an amount of education both for the eye and the mind, which might be productive of incalculable benefits to the whole population.

The "blarney-stone," that famous smoothener of tongues, might be unhooked from its precarious position in the wall of the old castle, and give the visitors an opportunity of embracing it without climbing the rickety tower where it now hangs. How Cromwell would look amazed, could he in the midst of all, revisit the scenes of his old exploits! Could one of the M'Carthy Mores, if restored to life, ever believe that the site of the Industrial Exhibition was part of the territory over which he and his clan held sway! The gentle Spenser, the author of the "Faerie Quene," spent some happy days in a shady valley near Cork. Were he to revisit scenes of his early wanderings and musings, could he believe that the country was the same from which he had fled in the night from the burning ruins of his house, pursued by the fierce war-cries of the insurgents, or that the peaceful crowds who will throng the Palace of Industry, are the descendants of the barbarous tribes, who in his days, wore daggers and saffron cloaks, and long hair, and whose lives were one long foray, or rebellion?

NAPLES AND VESUVIUS.

VIEW OF NAPLES.

The accompanying view of Naples is taken from the midst of the villas and country-houses which cover the hills, at the foot of which lies the old town itself. Over the tops of the trees may be seen the arches of the viaduct which leads from the fashionable quarter to the summer palace of Capo di Monte, and which passes over a valley filled with the miserable abodes of the populace. The trees conceal from our view, as we stand on the terrace of the villa, the great hospital, called San Gennaro de Poveri, which gives entrance to the vast and curious catacombs, where the paintings of the Greeks, Romans, and Christians are still fresh-looking and brilliant, surrounded by erections of astounding grandeur and magnificence. The new town in which the rich reside, extends from Toledo to the king's palace, along the brow of the hill behind the gardens of Villa Reale. The old town, low-lying, fetid, and filthy, inhabited by a half-naked, and turbulent population, narrow streeted, irregular and confused-looking, lies before us on the shore of the bay, with the towers of churches and convents rising above it, which were erected in the middle ages to hold out to these miserable wretches the prospect of that happiness in the next world, which had it been denied them in this. Beyond, clusters of houses may be seen scattered at intervals along the sea-shore. These are the villages of Portici, of Resina, of Torre del Greco, and of l' Annunziata. Beneath Resina and Portici lies Herculaneum; and farther on, near the foot of the volcano,—Pompeii, the the buried cities of the ancient world; farther still, was another named Stabia, no trace of which has ever been discovered, and at the extremity of the horizon appear the verdant Castellamare, and Sorrento. In the midst of all these lies the sea, calm, clear, and blue; and beyond all, Vesuvius crowned with smoke and flame.

Such is the country which is now possessed by the most reckless, lazy, and superstitious race that ever cursed a fertile soil and glorious scenery. Everything that nature can produce to charm the heart or delight the eye is here found in rich profusion; and many a tourist who has wandered over Europe, along the vine-crowned banks of the Rhine, or the valleys of the Tyrol, or has lingered amidst ruins of the Parthenon as it was gilded by a Grecian sunset, and been soothed by the soft murmurs of the Egean, or has rambled along the shores of the Bosphorus, rich as it is in picturesque combinations of water and wood, rendered classic by a thousand historical reminiscences and inspiring sentimentality by the old and oft told tale of the loves of Hero and Leander, has been forced to confess on arriving at Naples, that the scene before him surpassed all others. The shores of the bay are rounded with lines of exquisite grace and beauty. It is closed on the side of Naples by the Cape of Mysene, and the side of Sorrento by Cape Massa, the former of which makes between it and the promontory of Pausilippo another beautiful creek, that of Pouzzoles. It is guarded on one side or other by islands which seem scattered there like sentinels to watch over the gulf. Ischia looks like a great ship swinging at her anchor, by the side of which, Procida lies like a little launch or barge. When we pass between those two islands, and look back upon Naples hiding herself, as it were, in one of the many folds or indentations of the coast, in the midst of graceful and verdant undulations of the surface, and surrounded by hills rising gradually higher and higher till Vesuvius towers above them all, the spectator can hardly bring himself to believe that the scene before him is not the vision of a dream, or that even nature herself could produce combinations of such marvellous beauty. The light plays on every part of the landscape with that wondrous brilliancy for which Italian skies are famous, producing the most astonishing effects of chiaroscuro, bringing the low-lying parts into salient projection, and diffusing a soft and tender radiancy over the whole. Often, also, it seems to become mingled with coloured vapours, and gives a purple tint to air, earth, and water. Everything appears for the time to have received a coat of one and the same colouring, and in a moment all is changed, as if to strike one with astonishment. A painter who has not seen this transfiguration of nature under the influence of light, does not know what colour is. The Neapolitan landscape is incapable of being properly transferred to canvas. Even Claude Lorraine has not reproduced it with faithfulness.

INTERIOR OF THE CRATER OF VESUVIUS.

The naturalist, as well as the painter, may find at Naples a multiplicity of objects for study. In other parts of the world the general features of the landscape are unchanging; but in Naples there is a change in the configuration of the country almost every year. Vesuvius, which every night throws up new objects for the investigation of the man of science, every hour presents a different aspect. An elevated point called Cima, rises still higher than the crater, and there can be little doubt that in it the crater was situated in former times, from which issued the lava which destroyed Herculaneum and Pompeii. Some years ago, the crater was a vast abyss, the top of which one could lean over, and look down into the interior. At present, it is filled up nearly halfway, and in the centre a cone rises with a narrow opening on the top, through which smoke and flame are constantly issuing. Whenever a large quantity of the *débris* is collected, it is thrown off by a violent eruption, which sometimes changes not only the shape of the mountain itself, but often the configuration of the country around its base. A meteorological observatory is built, on the side near the top; but it does not seem to be a very safe position for the observers.

But it is not only in the curious phenomena presented by Vesuvius that the visitor finds something to interest and delight him. The little bay of Pouzzoles, reproduces with less vigour but with more astonishing effects the phenomena and beauties of the gulf of which it is at the same time a part, and a perfect image.

Naples possesses still greater attractions for the antiquary than for the naturalist. The volcano, which is stated to have ingulfed the cities of antiquity, has preserved them for our examination. Nature has saved them by its own fury against destruction from the hands of man. Herculaneum and Pompeii, buried under the dust and lava of the volcano some years before the Christian era, furnish now, when excavated, the most interesting and extensive remains of antiquity which have come down to us, though, in all probability, those that have been already discovered are by no means either the richest or best of them. Here we have produced before our eyes curious revelations as to the private life of the old Romans, their furniture, manners, and customs. And in other remains which the same eruption has preserved to us, we can lay our hands, so to speak, upon the highest forms of their faith, their poetry, their learning, and the mighty powers of their civilisation. Through the whole extent of the country may be seen immense caverns excavated in the rocks on the mountain-side, which, for aught we know, may have served as abodes to the pristine inhabitants, like the Testrigones of Homer, or the Myrmidons of the island of Ægina. The most curious of these subterranean passages or caverns is that in the bay of Pouzzoles, on the bank of Lake Avernus, in which the famous Cumæan sibyl is said to have dwelt. Virgil was fully authorised, without doubt, by old traditions to people the spot with strange apparitions. The phantoms seem to glide still along the steep shore of the lake from the sibyl's grotto, which opens in the midst of leaves prematurely withered by the cold air of the valley, and looks dark, mysterious, and half-hidden, like the gate of the ancient Hades. Passing along its damp and obscure corridors, we arrive at the recess in the interior of which she was in the habit of reposing after the bath, and to which none but the emperor was ever admitted to converse with her upon the destinies of the world.

Between Baia and the Cape of Mysene, upon the banks of the Mare Morto, are the "Elysian Fields," a burial-ground close to the water's edge, and the foot of a range of hills which ward off the winds from every quarter, and make the air above calm and still as the everlasting sleep of those that rest beneath the turf. The soft waters of the bay gently beat against tombs, and over them spreads the foliage of the numerous trees, graceful, transparent, and light as the shadows they throw on the ground. No wonder the ancients called the place the Elysian Fields, as emblematical of the repose of the spirit-land where the good, and brave, and wise wandered for ever in dreamy pleasure. Tradition says that the Cumæans were in old times in the habit of carrying their dead across the stream which they likened to the Styx of the other world, in order to deposit them in this tranquil valley. The boat, the passage, and the "place of tombs," thus became the symbol of the grand ideas of the nations of western Europe. We can never have a just notion of the august simplicity of the ancients until we have seen the places to which they attached some of the sublimest fictions of their mythology. Nor can we form the remotest conception of their magnificence until we have travelled along the coasts of Naples, which they have covered with monuments of their luxury and splendour. Baia and Pouzzoles have preserved the best remains of these, in some places the ruins are still standing upon the shore; in others, the sea has made inroads upon the land, and swallowed them up; but on calm evenings the peristyles of temples and the domes of palaces may be distinctly seen at the bottom.

Beside the craggy rock of Gajola, a flight of stone steps rises abruptly from the water, and doubtless in former times led to the palaces built upon the hill near the shore. The inhabitants call it "Virgil's School," as if the poet had there held communion with the waves. In the same place, in the midst of rubbish thrown up by recent excavations, may be seen the outlines of a villa which tradition states to have belonged to Lucullus. Flying from the monotonous and sultry plain in the centre of which they had fixed the metropolis of the world, it was to Naples that the Romans always repaired for pleasure in their leisure hours; it was there that Art, cherished and encouraged by a delightful climate and glorious scenery, seemed to labour in man's service alone; it was there that the genius of the Latins, coming in contact with the Grecian delicacy and refinement, was softened and improved by the union, and produced some of the most glorious works of ancient civilisation; it was there that Virgil equalled Greek poetry in the midst of towns and villas which rivalled those of Greece in elegance and taste. In the Museum of Naples are collected all the paintings, sculptures, inscriptions, furniture, ornaments, books, &c., which have been found buried in the earth in various parts of the adjacent country. Fully half the books are found to be works of Greek authors, with which the Romans were in the habit of beguiling the hours of elegant leisure. But in the buried cities all is still the same as before the lava flowed from the blackened mountains. We can there place our foot in the track left by the Roman sandal, and awaken the echoes which their voices, long silent, once called forth, and in some sort read the measure of their ideas upon the walls on which their eyes were many a time fixed, when the words fell from their lips which were to decide the fate of nations.

Upon this smiling tomb of antiquity, a lively and excitable population swarms at the present day. There is not in the world a people who bear their misery, and degradation of their condition, with more gaiety and animation. If the stranger can become reconciled to their nakedness, squalor, filth, and ceaseless begging, and their language at once elliptical and redundant, he will soon begin to perceive in them a vast amount of innate power and resources. Poetry, which dies out in the midst of wealth and civilisation, lives here in the midst of indigence and ignorance. Every day at the same hour, the *improvisatori* assemble on the Mola, and pour forth in discursive, but harmonious language, the epics, which their poets of an earlier date have handed down to them. Passing from scenes like this, recalling to our minds the rhapsodists of ancient Greece, we may plunge at once into the midst of scenes and society of which the ancients never dreamt. We may ride on the railway to visit Cicero's house, at Pompeii, and measure the Pelasgic pavement, on which the old waggons and chariots have left their track; and returning to the city, jostle amidst crowds of pedestrians in the Toledo, or be run over by a brougham or char-à banc in Chiaja. All around is the gaiety of Paris, and the wealth of London, boundless luxury and profusion, all that can charm the ear and delight the eye, a sea glittering like gold by night or by day, a magic sky, on every side the most glorious memorials of Greece and Rome. No wonder that the people in the midst of the rags and slavery, still shout with enthusiasm, "*Vedi Napoli, e poi mori!*"

To ascend Vesuvius during the day is a capital exercise, for the lungs and muscles. Adventurous individuals who are desirous of having a peep into the crater, generally start from Naples after breakfast, about nine or ten o'clock in the morning, and can get back in time for a six o'clock dinner, after having amply gratified their curiosity. The Neapolitans love foreigners for the sake of foreign money; and they have, therefore, done everything in their power to attract them, by smoothening the ascent, and thus as far as possible diminishing the fatigue, so that there is now neither much glory nor much danger in climbing Vesuvius. The only risk lies in the probability of an eruption, when one is on the top, but the good-natured mountain takes care to growl and fume a good while before proceeding to extremities, so that few are taken unawares.

The mode of ascent depends very much upon the object the traveller has in view. Some go up to escape from ennui; others for the poetry of the thing, others for the pleasure of it; some few for scientific purposes; a great many from mere curiosity, expecting to see what sort of a place the lava is manufactured in; and a greater number still to have something to boast of, and frighten the old ladies with when they get home. Rich, *blasé*, travellers, generally ride in a calash to the hermitage, that is, two-thirds of the way; they have then only to climb the cone at the top; but this is accomplished by the aid of guides, litters, and handbarrows. It is greatly to be regretted that a wealthy man cannot order an eruption of the volcano at a given hour, have the account sent in, and pay for it, as he does for everything else.

But those who travel, with some sort of enthusiasm for their work, with the feeling that they have "a mission," as everybody is said to have nowadays, and who believe that nothing is much relished that has not cost some labour to obtain it, climb the mountain either alone, or with one companion, and "rough it" all the way on foot. The tourist must, on arriving at the base, lay aside all thoughts of the world below, and deliver himself, soul and body, to the task before him, keep his eyes fixed on the summit, and his thoughts in the crater. Every time he sits down to rest, he may enjoy a treat, the like of which cannot be had in any other part of the world, the frequent changes in the perspective, the splendour of the sky; the azure colour of the sea, the long black lines where the lava seems to descend like streams between verdant banks, and the glorious plain below, beneath which the ancient cities lie buried, combine to form a scene of enchantment; and then on reaching the top, where you seem to stand on a heap of ashes, half stifled with noisome sulphurous exhalations, with everything around, black, scorched, and dismal, away in the distance appears Naples, white and beautiful as marble, with its glittering bay, studded with islands like diamonds set in gold, from which the sunlight flashes in splendour; who that has ever beheld all this, does not feel the truth of Chateaubriand's exclamation, "*C'est le Paradis vu de l'enfer!*" "It is Paradise seen from hell!"

By another class of travellers, whose finances do not allow of their fitting out an expedition for their own special benefit, the following plan is adopted:—Upon a certain day the names of all these staying at the different hotels in the city, who wish to join in making an ascent of Vesuvius, are taken down by one of these enterprising and officious individuals who abound in every part of the world, and on an appointed day they all assemble and breakfast early upon oysters, soaked in the Ischian white wine, and set out in carriages towards Portici; and they are assailed, long before reaching the place, by a horde of guides, all recommending themselves and their asses or mules at the top of their voices. At last, in the midst of awful uproar and confusion, a bargain is struck for the services of a certain number of men and donkies, and the more ridiculous the equipage of the party, the merrier are they. At last, they all set out together along the road through the vineyards, shouting with laughter, joking, trotting, and galloping. Some of the donkies get restive, and give indications of a desire to go no further, or unseat their riders by sundry vigorous elevations of the more ignoble portion of their animal economy, or become unmanageable and go where they please; but at last, in the midst of the tumult and confusion, the party arrives at the *Hermitage*, and here, whether hungry or not, every one must eat,—whether thirsty or not, he must drink. This is a part of the proceedings which no one is allowed to pass over. Having drained some glasses of "*lacrima-christi*;" wine grown on the spot, on they dash, the verdure begins to get thinner, and at last disappears altogether, the ascent steeper, and nothing but lava on every side. The asses are now abandoned, and the travellers begin to climb over the huge blocks which cover the side of the hill. The ladies are sometimes placed in a chair supported on two long poles, and thus carried up by two sturdy guides; many of them, however, trust to the assistance of their chaperons, and make their way on foot. As they advance the ground gets rather warm; and through the fissures which now and then intersect their path, the lava may be seen still in a molten state, with sulphurous fumes coming up from it. The gentlemen thrust in their sticks or pieces of paper, the sticks begin to smoke forthwith, and the paper goes off in a flame, and the young ladies, especially the English, give utterance to vehement ejaculations of surprise at such an extraordinary phenomenon. They sometimes thrust a coin into the lava, and drawing it out again, the lava cools upon it, and thus remains a memorial of the ascent. Sometimes also they dine near the crater, and boil eggs and make coffee in the burning crevices. Having satisfied their curiosity, they descend,—but of course much more rapidly than they ascended, passing over in five minutes a distance which consumed half an hour to get up, sliding the whole way, till on arriving at the foot of the cone, they remount the asses, and ride back to Naples, where they treat their friends to reminiscences of the trip. Our engraving may give the reader a good idea of the state of the crater within the last few years.

The following summary, by Sir R. Phillips, of all that is known as to the origin and nature of volcanoes, may not prove uninteresting to our readers.—

"The mixture and confusion of materials which compose the crust of the earth, and the great internal heat, necessarily generate combustion, and also create various gases in caverns and hollows, whose expansion rends the incumbent rocks and strata in earthquakes, while in some instances, where the materials are abundant, they give rise to vents called volcanoes.

"This chemical fermentation shows itself in various forms. Sometimes in mountains, where there is access of air, and the water of melting snows, or communications with the sea. At other times, in hot springs, in emissions of carburetted or sulphuretted hydrogen, in vents, explosions, and consequent vibrations of the strata, called earthquakes. As they may be imitated in various compounds, there is little to surprise in them, though much to dread, from their destruction of human structures, and the terrific magnitude of their devastations.

"They generate peculiar mineral products in lava, pumice, basalt, sulphur, &c., and the appearance of these is always a proof that the site has been volcanic. Water, by generating hydrogen, feeds, rather than smothers, such vast masses of burning materials, and hence volcanoes under the sea are very common, and by generating greater volumes of steam, they are more extensive in their action even than volcanoes on land.

"Taking volcanoes at 200, each operating on 100 square miles, they affect with their products 20,000 square miles, and if five times their existing number have become extinct, it gives 100,000 square miles of volcanic products. This, however, would be only the 20,000th part of the earth's surface. They may enlarge a mountain, and their gaseous products may cause earthquakes and uplift beds of strata, but it is fanciful to refer to them the inequalities of the earth's surface.

"Humboldt, a great authority on every subject, maintains that dynamical earthquakes, and chemical volcanoes, have their causes in the interior of the earth, and act through fissures and empty veins. He ascribes the mud and fishes, often distributed, to snow and lakes at the sides of volcanoes, and considers the matter properly ejected, as ashes and lava only. When the summit of Canguairazo, 18,000 feet high, fell in, 43 square miles were covered with mud and fish.

"Volcanic action does not consist in the combustion of beds of coal, but in chemical operations, seated deep in the oldest formations. The hot-springs in Germany issue from gneiss, granite, and clay-slate.

"Professor Daubeny ascribes earthquakes and volcanoes to the access of water to the inflammable bases of the earths and alkalies. When the explosion is single or double, and confined in a cavernous space, it is an earthquake; and when fed and supported by water, as in an elevation, it becomes a volcano. Humboldt and Davy also ascribe volcanoes to the oxydation of the bases of the alkalies and earths.

"Just as water burns potassium, calcium, &c, so it heats all other alkaline bodies, by imparting its oxygen to them; and this union, and loss of bulk, is the cause of earthquakes, volcanoes, hot-springs, &c.

"It is probably, also, a chief cause of subterraneous heat, since increase of temperature is the immediate result of the contact of water with any alkaline earths, alkaline states of metals, &c. When the fermentation is commencing, smoke appears; noises are heard; earthquakes take place; and explosions of ashes, sand, and stone, precede the flow of melted lava. The smoke consists of steam, and carbonic, sulphuric, or muriatic gas The ashes appear to be exploded lava, and are often carried by the wind 100 or 200 miles. Thick accumulations form a compact stone, called tufa, and the scoria is like the slag of iron furnaces. The explosive force is such as sometimes to throw stones of 200 tons eight or nine miles.

"All volcanoes appear to exist near the sea, and, by the matter they eject, to have some communication with it.

"Countries, near mountains, are more subject to these effects, because water penetrates their sides to the secondary rocks. Where, frequently, the escape of gas might be facilitated, by boring down to the granite.

"Ships, by a sudden protrusion of the water, feel the blow as though they had struck on a rock. In this mechanical effect there is no indication of electrical action, and, in truth, the whole, beyond doubt, is a mere gaseous expansion under masses of strata. No doubt, also, the earthquake arrests for the moment, the librations of the unlying masses of water.

"A line of granite hills has obstructed the action of an earthquake from one side to the other side, the tertiary and secondary strata being evidently those affected.

ASCENT OF THE CONE.

"A single shock lasts a few seconds. The common occurrence of radiated rents in the ground points to the cause in confined gas. Caverns and hollows in the earth give way, and often swallow tracts, which fill up with water from the adjoining strata.

"There is no evidence that volcanoes are so much as five miles deep.

"The American volcanoes throw up chiefly slime and mud, with slag and ashes.

"Primitive rocks are not near volcanoes.

"With an inclination of only 6 deg. no lava from a volcano can rest on its sides so as to increase the bulk; but in Etna, &c., the rise is 29 deg. to 32 deg. The strata of tufa round Vesuvius is not a product of the volcano, but a marine formation like limestone, and has its own crystals not volcanic. Von Buch says, the volcano forced its way through the tufa. The hills are composed of trachyte, a coarse, splintery basis, in which are embedded crystals of glassy felspar and augite. Cones of volcanoes are sudden elevations through casting.

"Geological theorists assert, that the inequalities on the earth's surface arise from upliftings by volcanoes, earthquakes, &c., and to these they ascribe the inclinations of strata, &c. &c. But the minute seams in sandstones, and the parallelism of the strata in the same formations indicate that the whole is the effect of depositions and precipitations, while in the submersions by the sea, and the advance and retreat during perihelion periods, we have the aqueous agency required for the precipitations.

"About 200 active volcanoes are recorded, of which 89 are in islands. Submarine volcanoes often throw up islands. The Azores, the Lipari, the Canaries, &c., are examples.

“The ashes from volcanoes often produce total darkness from thirty to fifty miles round, and they often fall in showers from 200 to 300 miles distant. Pieces of rock are ejected with the velocity of a cannon-ball. Cotopaxi once threw a piece of 100 cubic yards eight miles. Fish ejected from volcanoes are those of neighbouring waters.

DESCENT OF THE CONE.

“Lava is a stony substance like basalt, and may sometimes be seen at the bottom of a crater red-hot, like melted metal, bubbling as a fountain. When it overflows the crater, it is very fluid. At Vesuvius, a red-hot current of it was from eight to ten yards deep, 200 or 300 yards broad, and nearly a mile long. In Mexico a plain was filled up by it into a mountain 1,600 feet high, by an eruption in 1759. Its heat was so great, that it continued to smoke for above twenty years afterwards; and a piece of wood took fire in lava three and a half years after it had been ejected, at five miles from the crater.

“Stones of immense size rise to the height of 7,000 feet, and others, darkening the air, fall 100 miles distant.

“Thirty-one great eruptions of Etna, have occurred within the records of history.

“In an eruption in the year 1693, the city of Catania was overturned in a moment, and 18,000 people perished in the ruins. The crater of Etna is a quarter of a mile high on a plain three miles across. It falls in about every hundred years. The mouth is a mile in diameter, and shelves as an inverted cone, lined with salts and sulphur. The central fiery gulf varies in size; and noises arise from it with volumes of smoke. D'Orville descended by ropes near to the gulf, but was annoyed by flame, and sulphureous effluvia.”

THE BUTTON-MANUFACTURE OF BIRMINGHAM.

"He is not worth a *button*," is a phrase which has been frequently regarded as descriptive of some individual, commercially, and even morally. And yet, scarcely any one that could be selected would be less definite than this. The man who passes along the street with a basket of flowers on his head, crying musically enough, "All a blowing—all a blowing," could name at once the price of those "bachelor's buttons" which form a part of his blooming stock, and a very little arithmetic will determine the value of one of those bright yellow blossoms; but the worth of a button—that convenient, ornamental, or indispensable article, often multiplied profusely on our garments—cannot be so readily estimated. For though apparently insignificant, a button has been made of substances as dissimilar to each other as they are various in their application, from a rude piece of horn to a precious stone; and from the stamped or cast pewter disc affixed to a military jacket, to the spade-ace guinea buttons profusely adorning the dress of the late Mr. Mellish when he startled the gazers on the race-ground at Doncaster; or the most costly and splendid article that modern ingenuity, when tasked, can produce.

Hutton, when describing the "toy trades" of Birmingham, speaks of their first appearance there, in the beginning of Charles the Second's reign, in endless variety; and thus proceeds.—"The first in pre-eminence is the button. This beautiful ornament appears with infinite variation; and though the original date is rather uncertain, yet we well remember the long coats of our grandfathers covered with half a gross of high tops, and the cloaks of our grandmothers ornamented with a horn button, nearly the size of a crown-piece, a watch, or a john-apple, curiously wrought, as having passed through the Birmingham press. Though the common round button keeps on with the steady pace of the day, yet we sometimes see the oval, the square, the pea, the concave, and the pyramid, start into existence. In some branches of traffic, the wearer calls loudly for new fashions; but in this, the fashions tread upon each other, and crowd upon the wearer. The consumption of this article is astonishing, and the value in 1781 was from threepence per gross to a hundred and forty guineas." But what a bound in skill has this manufacture made—like every other—since Hutton's days! while what a button *might* be made, with all existing appliances, at the acme of the art, is a question which we shall not now attempt to solve. We shall take, therefore, the manufacture of buttons as it is, and having visited the establishment of the enterprising Messrs. Elliott & Co., and the works of Messrs. Hammond & Turner, so long celebrated for their metal buttons, we shall classify their products as well as we can, and then describe, with all the simplicity and accuracy we can command, the various processes through which different kinds of buttons respectively pass. We commence with

METAL BUTTONS.

The common gilt button is made of sheet copper, slightly alloyed with zinc, which, having been reduced by the Flatting-mill, is supplied to manufactories such as we are now about to describe, in strips. From these, circular pieces, technically called "blanks," are cut by a press adapted to this purpose, having a circular punch, worked by a lever or handle. A female, seated before a *blank-cutting press*, holds a strip of metal with one hand, and the lever in the other, and this being put in action, the punch descends and instantly cuts out a blank; and as she exposes new parts of the surface to the punch, the blanks are multiplied with surprising rapidity. In the same way, it should be observed, blanks of various kinds are produced. In all Button Manufactories there are numerous rows of these presses, differing in size and fitted with various punches and dies, according to the operations for which they are intended.

The common gilt buttons, for coats, are formed of blanks flat on both sides; but the page in his sky-blue garments has perhaps, three rows of little globes suspended from his jacket; while the outer surface of the coachman's buttons are convex, like those of the footman, who stands so gingerly behind the carriage; and the rotundity and convexity of the two kinds are given alike to blanks *after* they are cut. There are differences, too, among convex buttons; for some are of one thickness only, showing at the back the concave side; while others are hollow, being formed of two blanks, one called the *shell*, and the other the *bottom*, and named, in consequence, *shell buttons*.

A machine, similar in principle to the punching press, but having, instead of a punch, a concave polished surface to act on the metal, gives to the blank the convex shape. Such is the facility acquired by practice, that a female will render convex twelve gross of blanks in an hour, which is not far from thirty per minute! This cannot fail to be regarded as truly astonishing, when it is considered that every blank is put separately into the die; that the hand acts on a lever that the punch may descend to give it the required impression, and that only one blank can be rendered convex at a time.

The edges of blanks, on being punched out of a strip, are so sharp, that they would cut anything with which they came in contact. They are, therefore, placed on a low table, at which a young woman is seated,—as in the illustration,—that she may roll them between two pieces of steel having concave edges. One of these pieces of steel slides up and down, being set in motion by the handle in the girl's right hand. The button has thus its edges completely rounded; and then, dropping into a drawer underneath, another blank instantly takes its place.

The two parts of a *shell button* are brought together by the application of a die and punch. So completely do they act, that the edge of the *shell* is bent over and lapped down on the *bottom*, uniting them thoroughly, without any other fastening whatever. Then additions are made—as the words stamped on the back, the crest of the nobleman or gentleman to whose livery the button will be attached; the decorations of those used by our sportsmen in allusion to fox-hunting, deer-stalking, and similar recreations; the symbols of various club-houses; the names of our railways; or the national devices peculiar to the army, or

> "The flag that braved, a thousand years,
> The battle and the breeze."

Such buttons are always produced by steel dies, with the designs they are to give engraved in reverse. But sometimes there is a double pattern—one on the die, and one on "the force" which descends upon it. Men work the stamps for these purposes, as requiring greater power than the presses previously described, to which the hands of females are fully equal.

A shank is an obviously essential part of a button, but this simple portion of its structure, strange as it may seem, is produced by a distinct class of manufacturers, of which there are a few in Birmingham. The fact is, that there must be minute and costly machinery for the proper making of shanks; and thus they can be bought at a much lower rate from an establishment appropriated to them, than they could be produced at in any one engaged in so many ways as the button manufactories always are. A coil of brass wire is so placed in a beautifully-constructed machine, that one end gradually advances towards a pair of shears, which cuts off a piece of exactly the right length. It receives its form as a shank from being pushed forcibly into an instrument adapted to that purpose; the end is struck by a hammer, to render it level; and a final movement causes the shank to drop into a box, ready for use. Each one of three firms in Birmingham is said to have made, only a few years ago, two hundred millions of button-shanks annually.

Workwomen attach the shank to the button. For this purpose, the button is placed with its back uppermost; the woman places in it the shank, and tightly clasps them together, by means of a small piece of bent iron. She now applies a little solder at the part where the shank is joined to the button, and when hundreds of them are ready, they are arranged on an iron plate, and subjected to that precise degree of heat which will melt the solder, and combine the shank and the button firmly together. The looker-on may well be amazed at the celerity with which those various movements are made.

As we now enter the apartments where the *gilding* of buttons is conducted, our conductor says, "There is a girl brushing on the gold." "Stuff" is the reply that instantly rises to the lips, "that's silver," and should it escape in an unguarded moment, the only rejoinder would probably be, "I beg your pardon, sir, it *is* gold; for as that metal is mixed with a great deal of mercury it becomes invisible, and the amalgam looks white." The whole process is well worthy of attentive examination. Forty years ago, the art of gilding buttons had arrived at such perfection in Birmingham, that a gross of them might be covered with three-pennyworth of gold, and were sold at a price proportionately low. An experiment was even tried to produce gilt-buttons without any gold; but though beer has been often made without malt and hops, to the vast profit of its brewer,—we must speak otherwise of its deluded and defrauded consumer,—the button manufacturer found in this instance that he lost more in the consumption than he saved in the material.

To form the amalgam, leaf or grain gold is dissolved in mercury, in certain proportions, by subjecting the mixture, for a short time, to a gentle heat, the mass being stirred with an iron rod. Having been poured into cold water, it is pressed in a piece of washleather, which allows any excess of mercury to pass through it, and leaves the *amalgam* fit for use. To prepare the buttons for its reception, they are thrown in their roughly-burnished state into what is called "quickwater" — a solution of mercury and nitric acid: the quicksilver attaches itself to the copper, and gives it a white appearance, and after repeated washings the buttons are dried and ready for gilding, which is applied by means of a brush. They are now shaken in a felt cap to remove the superfluous mercury, and are put into an iron gilding-cage, which is placed in a small furnace. This part of the process is shown in the illustration, where the girl appears opening one of the doors to see how it is advancing; and one of the cages may also be observed lying on the ground. A considerable loss was formerly sustained by the escape of the mercury; but, by that tact which is now so often discoverable even in the production of comparatively insignificant articles, the mercury is caught in the chimney, and after a time it is used again. Ingenuity has also been tasked to prevent the inhaling of the fumes of the mercury, which the former practice rendered very deleterious.

The gilding, moreover, is variously applied, and according to this is the name of the button. If the gold is brushed only on the outer surface, it is called "a top," but when the entire surface is covered, it bears the significant name of an "all over." Nor are these the only distinctions, for some gilding is called "yellow," the colour being affected by the previous use of a mixture called "similor"—"gold-like," compounded of zinc and mercury; while another gilding is styled "orange," from a different application. The colour of the gold may also be heightened by other processes.

The buttons are *burnished* with bloodstone,—so denominated from its being supposed in past times, that when worn as an amulet, it was a good preventive of bleeding at the nose; but now well known as the heliotrope; a deep green siliceous mineral, somewhat translucent, and often variegated with deep red spots. Here the lathe is employed; with his left hand the burnisher fixes the button on the chuck, and while it revolves, he applies the bloodstone with his right; the ear catches a slight twang; when, with another touch, the button flies from the chuck, bright as the most radiant sovereign that ever issued from the Royal Mint. Each one is taken from water, which the workmen warm in winter, to be thus brightened, and as it is necessary that it should revolve against the bloodstone with the greatest rapidity, the burnisher often employs a boy to put in motion the lathe, by means of an additional wheel, as shown in the engraving. We now proceed to

PEARL BUTTONS.

The substance for these buttons is "mother-of-pearl,"—the hard, silvery, brilliant, internal layer of several kinds of shells, particularly oysters, which is often variegated with changing colours of purple and azure. The large oysters of the Indian seas alone secrete this material of sufficient thickness to render their shells available for the purposes of manufacture. One genus of these mollusks, called *Pentadinæ*, furnishes the finest pearls, as well as mother-of-pearl. It is found in the greatest perfection round the coasts of Ceylon, near Ormus, in the Persian Gulf, and among some of the Australian seas. The shells used for buttons, are bought by the ton in London, from the merchants, and are taken just in the state that they reach the docks to Birmingham. They lie in the store-rooms of the manufactories in great heaps, as they would had they been thrown there by a band of Titans who had retired to rest after regaling themselves with an oyster-supper.

The shells are simply washed with water, and are taken as they are wanted to the part of the establishment appropriated to the cutting out of "blanks" from them, and of this process we give an illustration. A man stands at a strongly-formed lathe, which, as it revolves, puts in motion a hollow spindle, which has at one end some saw-like teeth—it is in fact a tubular saw. While his foot keeps it in action, and his left hand presses the pearl shell against the teeth, and these work their way into the shell, his right hand is employed in moving the tube along until the shell is cut through. In this way flat circular pieces are cut out; the size being dependant on the tube, the diameter of which varies from the size of a scarcely perceptible shirt-button, to that of the huge disk, not *quite* so large as a soup-plate, a series of which often edges each side of the coat of a "fast" young man. The workman goes on cutting blank after blank out of one shell, till it will yield no more of that size, when, throwing it on the floor, he leaves its perforated remains that another workman may extract from them a crop of smaller buttons.

Here, the economy is apparent which is so often discoverable, and indeed absolutely necessary, in all our processes of manufacture; but another may now be mentioned. Until within the last few years, the dark-coloured portions of the shells were considered worthless, and were, consequently, thrown away, but the happy thought occurred to some manufacturer, that dark-coloured buttons made from these parts of the shells might possibly find purchasers. The experiment was tried, and that with signal success; for not only did they sell, but they actually became so much appreciated, that the black parts of the shells, and the dark shells from the South Seas, became even more valuable than the white ones.

Fig. 1.

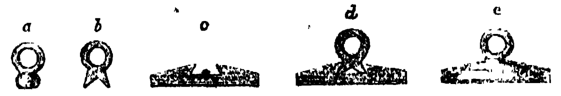
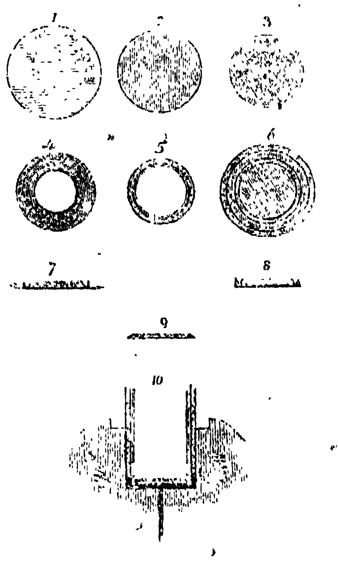
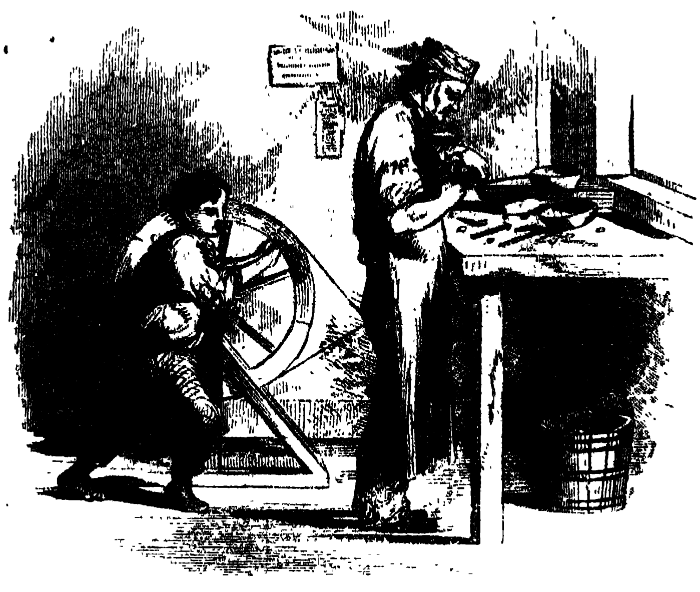


Fig. 2.



After the blanks have been cut out, a boy rasps them on one side, so that they may lie flat when placed in the chuck—the revolving part of the lathe—to which they are now transferred; and the turner gives the side that is before him, the flatness, indentation, or convexity that may be desired. In some pearl buttons a metal shank is inserted; while it is often required that they shall neither have holes drilled through them, nor the metal shank appear in the face, as perhaps this part has to be committed to the engraver, that he may ornament it with some beautiful design. And yet the button must be, obviously, prepared for being attached to the garment; and as no glue can be used, nor any heat employed to solder it, a very ingenious contrivance is resorted to, which is illustrated by the diagram: *a*, fig. 1, is the shank as it comes from the maker; this the turner fixes in his lathe, and gives it the form of *b*, which shows it in section. In the blank he now cuts a hole—wider inside than outside—a section of which is shown at *c*, and the shank being inserted in this aperture, he gives it a smart blow with a hammer, which spreads out the lower thin edge of the shank, as shown in *d*, and this causes the shank to adhere to the button with the greatest firmness. We give in *e* the external appearance of the finished article. So strong is the adherence, that a half-hundred weight has been suspended from a button thus constructed.


BURNISHING BUTTONS.

These buttons are polished with brushes, soap, and rottenstone. This part of the work is done by women, and like every process in this manufacture it is executed in a lathe. Women also drill two, four, or as many more holes as are required in these buttons, and that with surprising dexterity. A button, for example, is seen fixed into a chuck, when the ear instantly catches the sounds—*twit—twit—twit—twit*, according to the number of holes, and the button drops, infallibly pierced with those required, the distances being almost perfectly equal. In a similar manner, some buttons are adorned with rings, stars, and other decorations, according to the fancy or taste of the manufacturer; and finally, they have their edges corded or milled. The engravings of foxes, racehorses, &c., are always added by the ordinary process.

ROLLING THE EDGES.

We advance to the manufacture of

FLORENTINE AND COVERED BUTTONS.

This class of buttons is of a more recent date than that of gilt or of pearl buttons. Such articles were first made by hand with a needle and thread,—as they are still by private individuals,—but the large demand created for such products, so exceedingly diversified as to defy enumeration, has given rise to a series of processes discovering great ingenuity. Mr. B. Sanders is said to have taken out the first patent for making covered buttons by dies and pressure, and to have removed from Birmingham to Bromsgrove, a town in Worcestershire, in order to conceal the process from eyes he regarded as too curious. But the iron shanks he attached to his buttons were disliked. On his substituting another of catgut, at the expiration of his patent, he could not secure a patent for the new material, from its having been fifty years in use, and the trade was, in consequence, thrown open to the employment of an increased number of persons. Mr. Elliott is mentioned as having displayed much ingenious contrivance in the structure of the presses now so largely in use.

We take, as an example of this extensive branch of business, the manufacture of linen buttons, which, when made by hand, for domestic use, demand much time and care,—illustrating our description by a diagram.

A blank of fine Irish linen being cut out by a press, to form the face of the button No. 1, another piece of a coarser fabric is cut, No. 2, to place immediately behind it, while a smaller piece than either, and of middling quality, No. 3, is cut out for the back. The next part of the process is to cut out from a sheet of metal a piece, No. 4, which is then transferred to another press to be shaped like No. 5, having, in fact, a little channel made all round it by the outer edges being turned up at right angles, thus forming an outer and an inner rim.

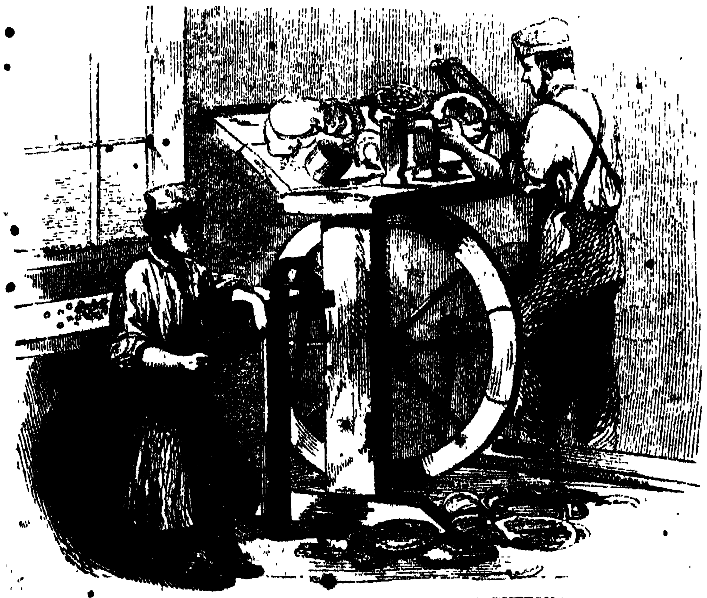
It is now taken to another workman. There he stands, attired in a green felt dress,—for other garments would be spoiled by the acid,—before a row of earthen pots full of divers liquids, and ready to suggest the caution,—should you be likely to approach too near,—"Take care of your trousers, sir." If now we look at his employment, we shall see that he is busily engaged in putting a dingy-looking lot of the button-rims, No. 5, into a perforated earthen pot; and then, taking it by the handle, and dipping this vessel into another full of acid, giving it, at times, a dexterous toss; he plunges them afterwards into water, where they have three or four rinsings in separate pots, till, finally, "the green man," though his colour be neither "Lincoln" nor "Forest," yet with an honest pride not always felt under a much gayer and richer costume, empties his rims—which he has thus effectually scoured, glittering like silver—into another vessel.

The subsequent stages of the linen-covered buttons are apparently complicated, but as they display on the part of the con trivers great ingenuity, and on that of those employed a marvellous dexterity, we shall strive to render our description easily understood. The pieces, No. 1 and 2, are now put with the piece No. 5, which has its outer and inner rims uppermost, and No. 3 being placed over them, its edges are tucked by means of a press into the channel formed between the two rims. In this state the piece that results from this combination, appears at No. 6, and also in section at No. 7, where the two folds of the linen thrust down to the bottom of the channel are seen, and the two edges of the rim stand up, with the linen for the back folded over the inside.

In No. 10, we have a section of the die, punch, and tube used in the next process, which is to tuck the two outside covers of the button between the rims of the metal piece, where the cover of the back has been already pressed in. A tube being forced down the hole in the die, to make the edges turn inwards, a hollow punch descends, and this presses the linen into the space just mentioned, as seen in section at No. 8.

GILDING FURNACE.

As we stand and look at the female who conducts this operation, we cannot fail to be greatly astonished. A little girl lays the several pieces in order for her, which we first see loose, when with two turns of the press and a little sleight of hand, out comes the button with its edges all nicely tucked in, though not as yet sufficiently firm and strong for absolute wear. It has, therefore, to be despatched to one more press, furnished with a concave die, which squeezes the outer metal edge of the rim inwards, and brings the button to its perfect state, as seen at No. 9. Endless in their varieties of shape and beauty as such buttons are, they are all produced by slight modifications of the processes which have been now explained. Florentine buttons, and every variety of covered buttons, some fringed, some covered with glossy silk, are to be seen at Messrs. Elliott's manufactory, but were we to detail all the processes used, and to exhibit the skill displayed, we should tire both ourselves and our readers.



CUTTING OUT THE BLANKS FOR PEARL BUTTONS.

In conclusion we allude to

GLASS BUTTONS.

Glass is now largely used for the manufacture of buttons, especially for waistcoats. The process here is exceedingly simple. The shanks are put through the glass heads (which, of course, are made at a glass-house), as the body of the button may be termed, and which have been pierced for the purpose. A small machine, guided by a female, is then made to penetrate and expand the projecting wire from its parallel position into an open shank, and this secures the glass, and forms the button.

The course we have taken reminds us that Fashion is a fickle dame. She is neither to be controlled by the merchant, the manufacturer, nor the consumer. Her impulses and her path are equally capricious. Beauty, elegance, and utility, are alike welcomed and spurned by the expressions of her countenance and the movements of her hand. She smiles graciously on some article just produced by the combination of ingenuity, taste, and labour, and how much toil of hand and brain perhaps only a few can tell; and then it cannot be multiplied with sufficient rapidity to meet the demands of her eager and ardent votaries. But soon she looks less complacent, or absolutely frowns, and the once highly-prized product sinks rapidly into insignificance and contempt. Though brilliant as a skyrocket, it takes its place with the wreck of the expended firework.

Some years ago, plain and fancy gilt buttons were "the style" for gentlemen's wear; but a short period has nearly annihilated this branch of manufactures. The effect of a change of fashion in such respects attracts but little attention. It may seem but of little moment to an individual whether there are on his coat eight buttons or six, yet the difference created by the adoption of the latter, if fashion renders it general, is just a deduction from the manufacture of twenty-five per cent, and may lead to a thousand or more persons being thrown out of employ. When Dr. Wilson, formerly Bishop of Sodor and Man, was one day being measured for a coat, he desired the tailor to put only a few buttons on it. "If every one did so," replied the tailor "the button-makers would be thrown out of work." "Say you so?" said the prelate; "then button it all over."

An effort was made about twelve months ago to direct the attention of distinguished persons to this subject. A body of operatives immediately connected with the manufacture of gilt and plated buttons, waited on Prince Albert, to request his acceptance of a selection of various beautiful specimens for his own wear, in the hope that it might lead to a revival of this elegant fashion. The prince gave them every encouragement, as did the Lord Mayor and other influential persons whom they afterwards visited. And the public had every opportunity of seeing a varied, artistic, and splendid array of buttons of this class, and of knowing what facilities were possessed for their production.

The button trade is more extensive than is commonly imagined. There are upwards of two thousand persons engaged in the pearl button trade in the town of Birmingham, and, perhaps, there are two hundred masters; whilst in the manufacture of cloth and metal buttons a larger amount of operatives is employed.

THE HISTORY OF GOLD.

GOLD, the purest and most ductile of all the metals, has from the earliest ages been considered by all nations as the most precious. The first historical notice of it is found in the 2nd chapter of Genesis, in connexion with one of the rivers of Eden, which compassed the land of Havilah, where there was gold, "and the gold of that land is good." In the same book we read that Abraham's servant gave to Rebekah "a golden earing of half a shekel weight, and two bracelets for her hands of ten shekels weight of gold." Pharaoh presented to Joseph a chain of gold to be worn about the neck. In the sacred vessels, implements, and ornaments of the tabernacle and the temple, gold was largely employed. The sacred writers frequently use it as an illustration expressing the highest estimate of anything, by stating that it was "more precious than gold."

The golden districts mentioned in the Old Testament are Ophir, Sheba, Uphas, and Parvaim, the sites of which cannot now be ascertained.

It would seem that, in the days of Abraham, silver, not gold, was the current medium of exchange, as it is the standard coin at present on the continent; for we read that, when he bought the field of Machpelah from Ephron, he said, "I will give thee *money* for the field." "And Abraham weighed to Ephron the silver which he had named in the audience of the sons of Heth, four hundred shekels of silver, *current money with the merchant*" (Genesis xxiii. 16).

The scarcity, purity, and beauty of gold, its rich and brilliant colour, peculiar to itself among all the precious metals, and, above all, its wonderful ductility, admirably fitted it for the purposes of ornament and art. Fourcroy tells us that an ounce of gold is sufficient to gild a silver wire above 1,300 miles in length, and such is its tenacity, that a wire of 1-18th part of an inch thick will bear the weight of 500 pounds without breaking. A single grain of gold may be extended into a leaf of 56 square inches, and gold leaf can be reduced to the 360,000th part of an inch, and gilding to the ten-millionth part. These qualities, together with its durability and compactness, soon recommended gold to all nations as the best standard of value. It was easily conveyed from place to place, a small quantity would obtain a large supply of other articles, it was sure to find a market, and none would refuse to accept it in exchange. Among all people, and in all ages, the love of gold has been proverbial as the most absorbing and the most intensely exciting of all the passions that agitate the human soul. How truly do the reports from California and Australia correspond with the words of the Roman poet:—

"Quid non mortalia pectora cogis,
Auri sacra fames?"

More than two thousand years ago, Aristotle, who was the clearest expounder of those principles of political economy for which Locke and Adam Smith have got credit, stated that the chief advantage of the precious metals as money was, that they are less liable to fluctuation in value than other articles. According to Herodotus, the ancient kings of Egypt had mines which yielded six millions sterling per annum. In the working of those mines the greatest cruelties were practised. Criminals, and captives taken in war, with their innocent families, were condemned to work in them for life, naked and ill-fed, under the lash of barbarous task-masters, guarded by soldiers of various nations and different languages, who could communicate neither with the workers nor with one another.

Gold-mines, or, as they are now more properly called, "gold-fields," are pretty much alike in all parts of the world. The regions where mineral wealth abounds are not fertile plains which invite and reward the labours of the husbandman, nor are they generally picturesque in their outlines. They are lofty mountain-ranges; bold, wild, heath-covered hills, treeless, barren, and desolate. It is not clearly ascertained how gold is generated, but in its natural situation it belongs to the primary or igneous rocks—the oldest and most deep-seated of those *strata*, or layers, which form the crust of the earth,—and it seems to have been developed by the action of fire upon the elemental matter of the globe. In its native place, it would have remained for ever beyond reach of man, but the Creator, in infinite wisdom and goodness, foreseeing the wants of our race, has by internal convulsions, and stupendous up-heavings and depressions of the surface of the globe, given a slanting direction to all the strata, so that in many places the lowest of them crop out on the surface and become accessible to man. But for this arrangement, gold, silver, tin, iron, coals, and other products, now essential to society, would have been wholly beyond our reach. But in addition to this, the rocks where the gold veins are found have been rent asunder, cast upon the surface, subjected to the action of sea currents, mountain streams, rivers, torrents, dashed together by the fierce conflict of the elements and borne down into valleys, and thus the glittering ore has been obtruded upon the attention of man, who, in some districts, has been treading on it for ages without being aware of its presence.

Unlike lead, copper, iron, and most other metals, gold is not mixed with a stony and gaseous substance which needs melting. It requires only a mechanical agency to separate it from the rocks, chiefly quartz, with which it originally united; and then it is found among sand, gravel, and *débris*, in the form of grains, spangles, or small lumps, coming thus pure and ductile from the hand of the Creator. The gold and diamond mines of Brazil are chiefly in the beds of shallow streams, or in the superficial alluvial deposits of exhausted streams. The rich mines of the Ural and Altai mountains are excavations in auriferous sand or shingle, as open as an English gravel-pit. An experienced gold-finder in California says, that the place to look for gold is in the neighbourhood of distinct traces of volcanic action, or in small streams coming direct from hills of volcanic formation, or rivers fed by these streams. An abundance of quartz, or spar, is regarded as a sure indication of the presence of gold; and especially if trap-rock is found cropping up among this quartz, and perforated with streaks of it.

It is a curious fact that nearly all the mines yet known have been discovered by accident, while scientific inquirers have failed to detect the precious deposit. It is thus, as tradition records, that the Hartz mine was discovered in the tenth century by a hunter named Ramm, whose horse, tied to a tree, pawed up the ground, and revealed the hidden treasure. In Saxony lead and silver-mines were disclosed by the tracks of cart-wheels. The rich silver-mines of Potosi were found by pulling up a shrub. In the reign of Queen Anne, Captain Sheldrake, an Englishman, discovered gold in California, yet it remained unnoticed by generations of Indians, by the Jesuit fathers and by scientific men from the United States, till it was discovered in the formation of a mill-dam.

The gold regions already known are very extensive, and are not confined to any latitude. Even Europe has not been without its share of the precious metal. In ancient times Spain was peculiarly rich in gold and silver mines. The former, lying on the surface, or to be reached by slight excavations, was soon exhausted. So abundant was silver that some of the commonest implements of the inhabitants were composed of it. We are told that when the Phœnicians first visited the shores, they loaded their ships with it to the water's edge, made their commonest implements with it, and even forged it into anchors. These are believed to be the "ships of Tarshish" mentioned by the prophet Isaiah, and Spain the chief portion of the region known as the Tartessus of Phœnician commerce.

In the reign of Queen Elizabeth £100,000 worth of gold was found in Cornwall. James V. of Scotland had 300 labourers searching for it at 4d. a day. The gold first appeared in the sands of the Elbao, a rivulet which joins the Clyde near its source, and a place where the soil was washed, long bore the name of *Gold Scour*. A specimen found on the Breadalbane estate, in Perthshire, weighing almost eight sovereigns, is preserved in one of the mineralogical cabinets of Edinburgh. In the year 1796 gold was discovered in the county Wicklow, in one of the streams which form the celebrated "Meeting of the Waters." A schoolmaster, accustomed to haunt this stream (Ballinavalley), was observed to grow rich — no one knew how; but the secret transpired in 1796, when a man crossing a brook found a piece weighing about half an ounce. Men, women, and children from all the surrounding country soon crowded to the spot, and it was calculated that £10,000 worth of gold was discovered by them. The place was then occupied by troops and regular works commenced, but they were soon abandoned as unprofitable.

The present Russo-Asiatic mines in the Ural Mountains were worked in a very remote antiquity, of which fact decided evidence exists in pits and galleries containing relics and implements. These are supposed to be the mines of gold referred to by Herodotus, worked by the Arimaspes, and guarded by monsters and griffins, which Humboldt considers to be identical with the bones of elephants and other animals to be found in the Steppes between the Ural and the Altai. The mining skill spent on all the gold that has ever existed in the world, is very little, the gold-finders, by a simple process, soon exhausting all that lies near the surface, and excavations of the auriferous rocks seldom repaying the expense. The Altai and Ural districts are exceptions. Works were recommenced there towards the middle of the last century, which have grown into the present town of Barnaul, the focal point of the Altai mines. An official return of the Russian government, of the amount of gold collected in the Ural and Altai, from 1829 to 1848 inclusive, gives a total of 16,420 poods; which, reckoning each pood at £2,000, is £32,840,000 for the whole period of twenty years, or an average of £1,642,000 per annum.

In Africa, the gold district of Bambouk extends over 10,000 square miles, and is found in alluvial beds of sand and pulverised emery; and also in quartz slate, which is pounded in large mortars. Other districts, bordering on the Ashantee country, have also rich gold-fields.

The Spaniards discovered the gold-mines of South America in 1492; from which time, till 1731, they imported into Europe enormous quantities of that metal, which had a most demoralising effect on the mother country, producing a taste for extravagant expenditure, habits of dissipation, neglect of agriculture and manufactures, the true sources of national wealth; and thus preparing the people for the social degradation and political thraldom that have so long cursed that fine country. The argosies that came freighted with gold from South America could hardly have failed to bring with them a blighting curse, on account of the cruelty practised in collecting the gold. By these cruelties entire populations were extinguished. "The natives of many of the West India islands were transported to Mexico to work the mines and perish. The Peruvians were largely devoted to a similar fate; and the first draughts of African negroes borne across the Atlantic were substitutes for the native races, as more competent to bear the drudgery which the rapacity of the European conqueror exacted. But retributive dispensations are not wanting in this dark and dismal story, which signalise the hand of an omnipotent and righteous Providence." Violent deaths befell many of the actual perpetrators of those crimes, while the countries to which the gold-freighted galleons came, are now the poorest nations in the civilised world.

The natives had been well acquainted with the use of the precious metals. The Mexicans not only gathered gold from the beds of rivers and superficial *débris*; but they also drew silver, lead, and tin, from the mines of Tasco, and copper from the mountains of Qacotollan, working veins in the solid rock, into which they opened extensive galleries. The Peruvians obtained the precious metals in the same manner, penetrating to the bowels of their mountains, not by sinking shafts, but by excavating small openings in their sides. On the Illimani mountain, Mr. Pentland found the face of a cliff literally honeycombed by innumerable opening for mining purposes. No wonder, then, that the treasures found in the palaces and temples of the Incas were enormous.

In the course of the last century the projecting point of a quartz vein in one of the highest mountains of Paraguay, was struck by lightning, shivering the mountain-side, and detaching a vast mass, which rolled into the valley and furnished an ample supply of gold. Sometimes it has been found in monster lumps. One of these obtained from the Ural mountains in 1826, weighed 22lb. In 1821 a mass, 8 or 9 inches long, by 4 or 5 broad, was met with in the United States, weighing 28lb. A still heavier one (32 lb.) had been found in the alluvium of the Island of Haiti in 1502. But in 1842, in the southern portion of the Urals, a mass was discovered weighing 96 lb. troy. It lay upon a stratum of diorite, at a depth of ten feet. It is preserved in the collection of the *Corps des Mines*, at St. Petersburg, and is valued at £4,000. In 1730 a piece weighing 60 lb. troy, was discovered near Le Paz, a town of Peru. But all previous prodigies of this kind have been thrown in the shade by a lump of 106 lb. weight found in Australia.

In 1845 Sir R. Murchison detected the presence of gold in this region; but it was reserved for Mr. Edward Hammond Hargraves, to call the attention of the world to the fact in February, 1850. Availing himself of his experience in California, he went on a "prospecting" tour, and discovered gold in twelve places, for which the governor gave him a grant of £500, and a situation worth £350 a year. In August, 1851, the weekly supply of gold coming into Melbourne was £13,000 worth, and according to the last accounts a good labourer at the diggings may clear £1,200 a year. As in modern society gold is the measure of the money, we may imagine the abrupt and violent revolution this will cause in society,—in a few days converting the foot into the head—the servant into the master, and *vice versâ*.

The valleys of the Sacramento and San Joaquin rivers in California are 500 miles long, and 50 broad, 25,000 square miles. Senora, the northern state of Mexico is said to be equally rich in golden sand, and other American regions are spoken of as likely to turn out extensive gold-fields. Science and experience, safer guides than the divining rods of the ancients, will soon detect these spoils of nature wherever they may be hid. But our own Queen commands gold regions four times the area of California, which have proved even more productive. It is calculated that the produce from Australia will not be less than seven or eight millions sterling annually.

A view of the supply of gold in past times may enable us to judge whether it will be greatly in excess in the future, allowing for the vastly increased demand for a metallic currency by the extension of commerce over the globe, and the demands of new patrons dealing largely in the productions of art, with numerous and busy cities in the wilderness of the western world. Humboldt calculates that America, from 1492 to 1521 produced £52,000 worth of gold annually, and £630,000 annually from 1521 to 1546. From the discovery of Potosi in 1545 to the end of the century, the supply of gold and silver from America was about £2,100,000 a year, while Europe produced only £150,000. During the 18th century, the yearly produce was £8,000,000. For twenty years previous to 1830 it was £5,000,000.

Mr. Wyld estimates the produce of all the mines in the world thus:—

	Gold.	Silver.	Total.
1800	„	„	£10,250,000
1840	£5,000,000	£6,750,000	£11,750,000
1848	£7,000,000	£6,750,000	£13,750,000
1850	£17,000,000	£7,500,000	£25,000,000
1851	£22,500,000	£7,500,000	£30,000,000

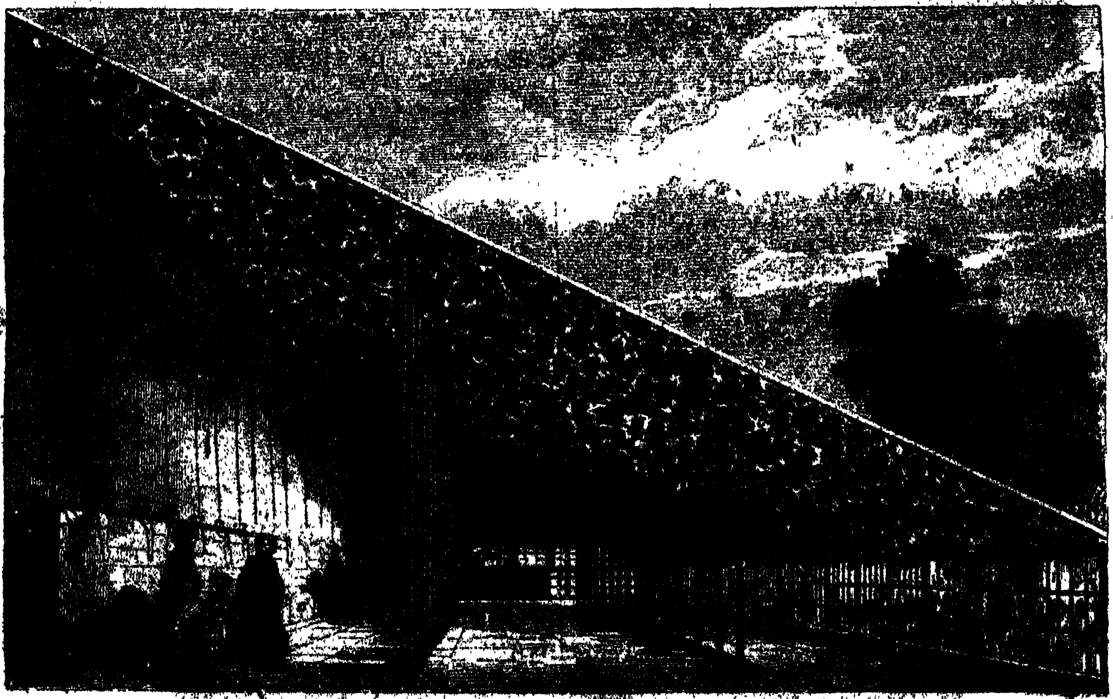
The American papers inform us that, according to the Custom-house books, the produce of the Californian mines in 1850 was £13,717,000, and for 1851 it was estimated at £15,000,000. Mr. M'Culloch reckons the annual consumption of gold by Great Britain, America, and the Colonies, for all purposes of art, ornament, and waste of coin at something over nine millions sterling. But the supply in 1851 was £30,000,000. This gives a surplus of £20,000,000—a supply treble the present demand: a fact which must have a serious effect on the value of funded property, the standard currency, and the nominal prices of other articles. The supply is not likely to decline for many years. The fever of gold-seeking will, no doubt, abate, the pursuit will assume a more systematic form, directed by science and controlled by government. Machinery will succeed manual labour, quicksilver will be made generally available for collecting the particles of gold. Steady remunerative returns to all, will succeed to the intoxicating fortunes of the few, and the bitter disappointment of the many.

The wild appearance, and disorderly habits, the fearful excitement and *self-sacrifice* that now prevail will be followed by a normal and healthy state of things. Business, now deserted, will resume its usual sway. A vast population of the most energetic members of the human family will be allured from the over-crowded cities of the old world, by this mightiest lode that attracts the human heart,—and these will be compelled, ultimately, to fall back upon the arts of agriculture and commerce, developing the resources of boundless tracts of fertile lands,—raising products which give even to gold all its value, and laying the foundations of great nations in the antipodes. Thus the love of money, the root of so much evil, will now become the occasion of immense good to the human race, so that it would seem as if Providence had reserved the discovery of these gold-mines till the great northern race should be prepared to people the southern hemisphere, and carry thither its Christianity and its civilisation.

We have scarcely noticed gold as *coin* and *currency*,—reserving this view of the subject for another article on the *History of Money.*

THE VINE AT HAMPTON COURT.

This vine, of the black Hamburgh species, is said to be the largest in Europe, and is upwards of 110 feet in length, with a stem nearly 30 inches in circumference, at three feet from the ground. It was planted in 1769. In one season it produced no less than two thousand two hundred and seventy-two bunches, weighing 18 cwt. There have been many opinions on the possibility of growing vines in England, in the open air, although many years ago the art of hothouse cultivation was perfected. In a pamphlet published by Mr. Hoare, some years ago, on the "Cultivation of the Grape-vine," many very valid reasons are brought forward in favour of the cultivation *of the grape-vine in the warmer parts of England*, and of all these, the strongest is, that Mr. Hoare gives an account of some very successful experiments conducted by himself. As far as this goes, we cannot see any reason why extensive vineyards should not be planted in the warm, sunny, slopes of southern England, where a supply of grapes might be grown sufficient to stock the London or provincial markets, without having recourse to the assistance of the continent. The extreme uncertainty of our climate, however, is the great barrier to the introduction of the vine into this country upon an extensive scale. The yield of grapes in particular years might be productive, but when we remember how sudden the changes of temperature are in England, and how frequently our summers are cold and wet, we may safely conclude that the average would fall much below that of continental vineyards, or the cultivation would entail so much expense, that our vine-growers could only hope to supply the tables of the wealthy. The south of England will, of course, always continue to supply grapes of good quality, but never so good as to exclude those of France and Germany.



THE VINERY.

The spots where the vine flourishes, and where vineyards are kept up, are said to depend for their productiveness more on the temperature of spring and autumn than on that of summer and winter; and this explains many seeming anomalies in the location of vineyards. The vine grows best in a soil where few other shrubs or plants would thrive; such as a deep, loose, rocky soil.

On the steep slopes of hills toward the south, and sheltered from the north-east, the grapes attain the greatest maturity, and the vintage is most certain. The culture of the vine is, perhaps, one of the most anxious and fatiguing which field labour presents; so numerous are the demands on the time and attention of the grower. It will bear any degree of heat, but not heat combined with moisture; hence a wet European season is usually a bad wine season. If it requires so much care and unremitting attention out of doors, even in a favourable climate, how much more difficult must it be to cultivate it in a hothouse, where every sudden variation of temperature may be fatal to it. The Hampton Court Vine may not only be regarded as the largest vine, but also as one of the most remarkable hothouse productions in Europe.

THOMAS WRIGHT, OF MANCHESTER.

THE PRISONER'S FRIEND.

PERFECT machinery, boundless capital, unwearying and exhaustless enterprise, strong heads and stout hearts, for these things Manchester is renowned in every part of the world. Few, too, are there who do not know that the capital of the cotton manufacture is distinguished by the names of Henry and Dalton in chemistry, Percival in medicine, and Liversege in painting. But of Thomas Wright, till very recently, who had heard? Yet while Henry was reaping the golden rewards of his discoveries, and Dalton, after a long life of secluded and unhonoured study, was wondering at the repute into which he had suddenly been raised, and while the din and the whir of those huge mills, each with its teeming population, was grinding gold-dust and creating social power, and wearing down human life, quietly and unseen was Thomas Wright performing a work greater than any other work done and accomplished in that vast workshop, and acquiring claims to esteem and reverence all the greater because unrecognised and unobtruded. And while, moreover, philosophers were speculating about principles of secondary punishments, and parliaments were legislating to improve our prison discipline, one humble individual, unbefriended and alone, was solving those problems, and realising that contemplated good, solely under the promptings of a benevolent heart and the guidance of a wise and thoughtful head.

Thomas Wright has good blood in his veins. He is a Saxon; he is a Saxon of the Scottish cast. To Scotland we on this side the Tweed are much indebted. To Scotland Manchester is much indebted; many of its most successful and opulent merchants are of Scottish origin. Scotland bestowed on the world a Burns. The world has now to thank Scotland for a Wright. Thomas Wright was, in the year 1789, born in Haddington, near Edinburgh, of poor but industrious parents, whose character, a rich dower, was their all. The father was a cattle-dealer. At the age of seven the son was placed under the care of a maternal aunt, who resided in Manchester. Inheriting the strong and deep religious feelings of Scotch Presbyterianism, and having a moral tone rather firm than amiable, she, as a hearer of Dr. Barnes, an English Presbyterian preacher of some repute, began the training of her nephew with the indirect assistance of that magniloquent Gamaliel. The lad, however, did not feel himself at home. The discipline of a Methodist Sunday-school was tried with little better effect. Yet in that Sunday-school did Thomas Wright receive his only education, except that which he gave himself. Not much, however, did he at first trouble his head with books. There was a spice of wildness in the youth. He had a will of his own, and that will led him to neither school nor chapel. Roystering companions and rough games were the young man's delight, and from coarseness he was led to something worse. Meanwhile, there, at home, in her humble seclusion, was his good religious aunt pining over the boy's self-will and vagrancy, and praying night and morn that he might turn ere he became a prodigal. Turn he did. He owed the change to the ministry of that pure-minded and loving man, the late William Roby. Henceforth Thomas Wright acted as well as felt like a Christian. Never had he been depraved. Conscience had always been alive, sometimes painfully alive; his kindness, too, had always been abundant; and now that a deep religious sentiment added its sanctions and its impulses to his previous moral yearnings, he became as consistent as he was earnest and devoted in what he regarded as his duty. While these moral and religious changes were proceeding, Thomas Wright had been serving his time in the foundry of the Messrs. Ormerod, in Minshull-street, London-road, Manchester, in which he spent all the labouring energies of his life, and which, except on a few rare holidays, he never left till Saturday, April 24th. There from his five shillings a week wages which he received in the first part of his apprenticeship, he, by dint of hard labour, spotless honesty, and ever-growing usefulness, raised himself until he received the weekly sum of three pounds ten shillings. Entering the foundry at fifteen, he quitted it in his sixty-third year, having been a foreman for more than half the period. The religious influence to which Mr. Wright now gladly owned allegiance, produced the best effect on his pecuniary resources and his domestic life. Yet it was a small sum the worthy man gained week by week; a very small sum, if you consider what the money had to do. One thing it did, it brought up nineteen children. Yes, on an income which did not average a hundred a year, Mr. Wright married twice, and fed, clothed, and educated nineteen children. This may seem an impossibility in Belgravia, but it was done and well done in the heart of Manchester. We say "well done," not that these children were taught either Parisian French or Parisian manners, but because they were made good wives and good husbands; and because, therefore, they have been and are centres of a high and durable domestic influence—the best of all England's treasures. But this small income did more. And here comes into prominence that which may make the cheek blush in many an opulent home. So far as money could accomplish such a result, this sum ministered to the necessities, and relieved the troubles, and healed the wounds, of the prisoner, the outcast, and the pauper. Early in his home-life did Mr. Wright begin the practice of apportioning his income among the objects at which he aimed. At the end of the week, after due deliberation made, so much of the common stock was allotted for food, so much for clothing, so much for rent, so much for the schoolmaster, and so much for the needy. The lines of the distribution were sternly observed. If the belly or the back pleaded against the head or the heart, the answer was "thy allotment must do, no trenching on other's rights can be permitted."

The benevolence with which nature has so largely furnished Mr. Wright, could not, in the natural development of his character, fail to engage him in some work of charity. If love is in a man, it will find or make for itself some outlet. What is called an accident led Mr. Wright to feel a special interest in prisoners and convicts. One day, while discharging his duties in the foundry, he was addressed by a young man of prepossessing appearance and manners, who asked him for employment. "I know your countenance;—is it possible? what! returned?" "Yes, Mr. Wright, returned; and not, I hope, the worse for my absence, as I think you will learn, if you will give me a trial." "That is not so easy; however, I should like to aid you, and if you are discreet, no one here shall know your history." "Thank you heartily for the chance of recovering my position; I know that a returned convict would be despised and scorned, if not hated, so be sure I shall keep my own counsel." The experiment proved eminently successful. Here was a beginning, and here was encouragement. But what took Mr. Wright to the gaol? A sad place is that gaol; sad and dreary is its aspect; painful and threatening there in the midst of civilisation and opulence is that "Bailey," as it is commonly called by its inmates. Very saddening as you pass is the appearance of its dark, frowning, huge walls and edifices, where hope is so rare a visitor, where joy is almost unknown, and where grief and tears have taken up their abode; very saddening is it to think that of the thousands that have gone through that massive portal, over which the emblematic chain offers an insult to misfortune and a derision to crime, only a very small number,—a very small number were bent on errands of mercy, and would do anything to abate the mass of wretchedness that festered within. Very saddening and grievous is the idea which that gloomy nest of cells and dungeons calls up when it makes one ask the question, "Is then this terrible cost a necessary cost? must so much be paid for our civilisation?" The question receives a negative answer in our mind. We say, "No! that cost is not necessary; we say that society by its neglects goes far to create the evils which it punishes, and that it punishes when it ought to renew and reform."

How this godlike work may be accomplished Mr. Wright has well shown, having proved that there is no depth out of which the genial warmth of Christian love may not more or less raise a fellow-man. Individual excellence is the great remedial power for the woes and the guilt of the prison. Individual excellence alone can revive and restore that almost extinct nature. Head to head, heart to heart, hand in hand; your eye beaming kindly on his, your words thrilling in his heart, your prayers mingling with his prayers; thus, you two alone, in strict privacy, in close and solemn communion,—thus, and thus only, can you hope to rescue your brother from perdition, and aid him to be once more a man, instead of being a convict and a transport.

It was by degrees that Mr. Wright was led to make these discoveries in his own experience. One of "the hands" in the foundry invited him to pay a visit to the New Bailey. "My father is a turnkey there, he has heard me speak of your kindness, he says kindness is wanted in the Bailey, and he hopes you will go and see him." Mr. Wright went. He went with a a high purpose; he went to minister to the guilty. At first, he was regarded with distrust, and experienced the coldness of official reserve. But he was as free from impetuosity as he was full of zeal: Calmly he went about his work, losing no opportunity of entering the cell and soothing its inmate, until governor and chaplain began to discover, first, that there was no harm in the man; secondly, that he had good qualities, and at last, that he was invaluable as an aid in all their higher desires and efforts. The result was, that he became a regular member of the establishment, an unpaid officer, a part of the machinery, a part so essential that without it the engine could scarcely work, or work most gratingly to the ear and distressingly to the heart; work, as it did for a time, when there was no oil of spontaneous love to ease its movements. All special, all difficult cases were consigned to Mr. Wright's care. The heart that the chaplain could not soften; the heart that the chaplain could not comfort; the boy or the girl that no one else could look after when the term of punishment was ended; claims for a special investigation of alleged guilt, made by condemned innocence; claims for a commutation of sentence; claims for shortening of the time of suffering; claims for remission of the entire penalty—all came, as naturally, into Mr. Wright's hands, and were treated by him in a spirit in which mercy rejoiced over justice, and yet in which justice was not disregarded. In a word, all the remedial and corrective workings of the law and the prison centered in him. He was the moral physician of the New Bailey. If there entered its walls a child who had received in any degree a superior training, and who would be grossly injured by being placed in company with ordinary prisoners, Mr. Wright interposed to procure for her a separate apartment and gentler treatment. When there came from one of the higher strata, a young man who had erred rather through the force of thoughtless passion than depraved principle, he found in Mr. Wright a friend who had an eye for good qualities, while he pitied and blamed bad ones, and who by constant attentions and judicious conversation, rather than rebuke or direct precept, after winning the prisoner's heart, lifted him up to hope and some degree of self-respect, and prepared the way for his eventual recovery. How soft and balmy were the words he spoke in the ears of aged offenders, and how did their heart sink and melt under their power. Even the incorrigible ones of middle life; men whose hearts were cankered, all whose feelings and impulses were perverted, and all whose wishes and designs were brutal and predacious; felt subdued and humbled before him, and yet desired the presence of a power which made them uneasy, and, for a moment, half-repentant. The worst cases had the largest share of Mr. Wright's attention. Murderers destined for the gallows he sedulously watched over. Safely may it be said, that not one of them but was bettered by his pious and loving cares. The last night of their earthly existence he was always with them to the latest moment that the prison regulations allowed. On the scaffold too, was their kind friend sure to appear. When condemned by the world, when deserted by companions, when disowned by relatives, in the hour of fear, in the hour of convulsive agony, in the hour of gloomiest death, they found in Thomas Wright sympathy, solace, strength. Nor was the beauty of his ministry marred by self-exaltation, nor its value and efficiency diminished by fanatical fervours or morbid sensibilities. Thomas Wright is a strong as well as a kind man: he is distinguished for good sense as well as good feeling; and without knowing it, he has in him—acquired in the school of life—a world of philosophy. Always wise, prudent, and kind, he can, when needful, reprove with firmness, and condemn without qualification; but so strong is the predominance of love in his character, that kindness ever mingles with his rebuke, and pity is ever in the ascendant; and to their blended influence his severe words owe very much of their power.

Without the prison Mr. Wright has been perhaps more useful. A great gulf divides prison life from the life of our homes. More the pity. But the gulf exists; it is a wide gulf; it is a deep gulf; darkness and ruin are in it; and therein have thousands, tens of thousands fallen to unrelieved darkness and irretrievable ruin. What mistress of a house will take as a servant a young woman fresh from the corruptions of a prison? What shopkeeper will receive into his service a boy whose back bears the scars of prison discipline? Where is the warehouse into which a man may hope to step from the treadmill? Nay, among their equals, persons of their own rank, "prison-birds" are scorned and scouted. Not one resting-place offers for the sole of their foot. Not one honest means for procuring a bit of bread. Starvation or pilfering is the sole practical alternative. A precarious life of contempt in society, or plenty and comparative ease in the prison; between the two few can hesitate long, and certainly the bulk of prisoners in their ignorance and moral infirmity are not likely to hesitate at all. Theft is preferred to inanition, and again the prison gates are closed on the pitiable victim. Pitiable? Yes, truly pitiable, uneducated, untaught, uncared for goes out and cast away, that boy has instincts strong as your own, feels the sickness of extreme hunger, shivers in the cold of night, is desolate at heart as he wanders through your crowded streets a despised stranger, deserves your commiseration if, under his complicated woes, he puts out his trembling hand and seizes a loaf. You will catch him, we know, and you will incarcerate him; and in so doing you will make him worse than he is, make his lot darker until it becomes hopeless, and thus you will punish him, you will give him what you call "his deserts;" nevertheless he is pitiable, and the more pitiable is he because the hand that ought to aid him to rise presses him down until it has crushed him. The gulf of which we have spoken Mr. Wright has attempted to bridge over. In scores of instances his efforts have been successful. Many a child has he restored to its grateful parents; many a youth has he enabled to re-enter the social paths from which he had been driven by guilt; many a young woman has he replaced in domestic service; many a transport to whom on his return England would have given no home, has he established in comfort and honest independence on his native soil. The task was by no means easy. It required money, it required time, it required energy, it required prudence, above all it required character, and the confidence which high character inspires. All these somehow or other, we scarcely know how, Mr. Wright supplied. And yet he toiled from five in the morning till six at night. What an exemplification of the maxim, "where there's a will there's a way!" Every evening was employed in the work; every Sunday was employed in the work; a minute now and then in the course of the day might be spared for the work; and "short time" might be imposed on the coffee-cup and the knife and fork, and the bed might be made to pay a large contribution. Yet how were these fragments wrought into the whole of this sublime benevolence? The actor himself could but very imperfectly answer the question. However, the work has been done, and the work is now proceeding.

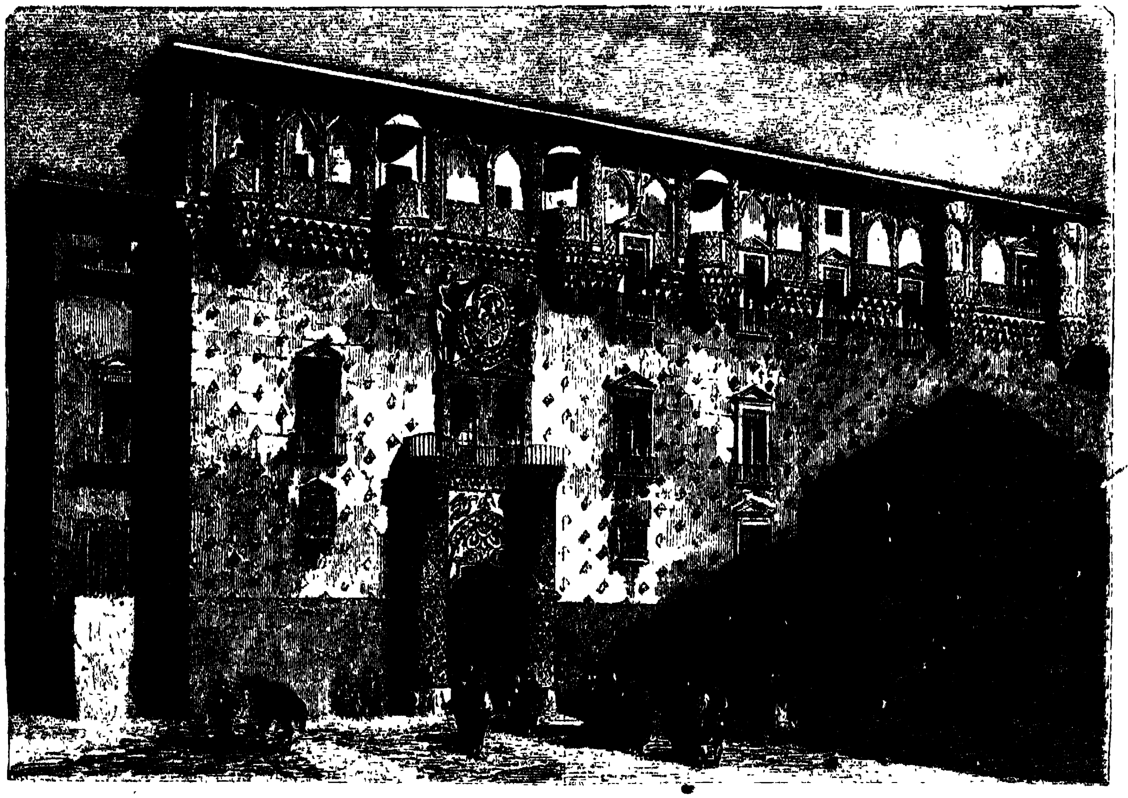
Without aid its accomplishment would have been next to impossible. The aid, when the amount of the work is considered, was not great. For years, many years, Mr. Wright laboured in obscurity, uncheered and unassisted. But there came to his aid a circle, of which the authoress of "Mary Barton" may be accounted the centre, that appreciated Mr. Wright's labours, extended to him sympathy, gave him openings into social life for his outcasts, and with a liberal hand supplied the deficiencies of his own scanty treasury. Assisted, without being patronised by the ladies of whom chiefly this circle consists, Mr. Wright found ready entrance into the mansions of the rich, the cabinets of ministers, the reports of prison inspectors; into poor-houses, and convict-ships, and penitentiaries. In a word, he became a celebrity, and found his means of usefulness multiplied around him. But how could he occupy this large, and to him inviting, sphere? There he was still in the foundry in Minshull-street, too conscientious a servant to allow even benevolence to detract a hair's weight from his daily and hourly service! Besides, he felt the presence of all these claims on his health and vigour. Not that Thomas Wright is a debilitated man. Arrived at the age of sixty-three, he is on the whole hale and vigorous, and has strength to perform a very large amount of additional good for his kind. Still the duties of the foundry and the duties of the prison were too heavy as well as incompatible. So thought his friends. Accordingly they came forward with that determination and that liberality which are characteristic of Manchester. The consequence is, that Thomas Wright, who has given freedom of body and freedom of mind to so many, is now free himself—free to yield to his own noble impulses, free to achieve a larger measure of good than as yet he has been able to put his hand to. His career is now only about to begin. At present he is "the Manchester Philanthropist;" ere long he will be "the Philanthropist of England." Nor will his benign influence be confined within our shores. With deep pleasure do we anticipate the amplest and the best results. At this moment Thomas Wright is setting out on a tour of two thousand miles; a tour of benevolence in which he will visit the needy, the captive, the convict, the lowly, and the great; doing in all cases whatever he can to abate the ills and augment the good of the world. Scarcely need we ask for him co-operation. His first course eloquently pleads his claims.

Wherever he finds an auditor he is sure to make a friend. But let the opulent remember that still—even should the solicited pension be granted—his pecuniary resources were inconsiderable when measured against the demands to which they are liable and will be liable.

Our portrait presents a faithful likeness of his countenance when in repose. If the traces of more years than he actually numbers are there; if the face is shadowed by a pensiveness inclining to melancholy, reflect on the character of his benevolent ministry, and you will learn the cause. But in that finely-carved compact dome, where reverence and love are so markedly prominent, and in the pious and gentle goodness of that countenance, you behold characteristics, proofs, and consequences of a practical benevolence the most earnest, gentle, self-denying, and constant. The man however can be fully seen and known only in conversation, when that thoughtful face is lighted up with the purest and brightest radiations of his own affectionate heart. But, no! really to know Mr. Wright you must behold him in his labours. In truth we believe that he is completely known, and can be completely known by none but those to whom he ministers. Reader, "go thou and do likewise."

THE PALACE OF GUADALAJARA.

The town of Guadalajara is situated on the left bank of the Henares, at about twenty-five miles distance from Madrid. Some Roman remains, consisting of an old bridge, a few crumbling monuments, and some inscriptions, prove that at one time they had a station at this spot, but the known history of the town is not carried farther back than the conquest by the *Arabs; by them it was called Guadalhiechara, or Guadalarriaca,* and, commemorative of their dominion, the remains of some walls and two mosques are shown to the traveller, one is used as a church, and is dedicated to St. Michael, and the other now forms the town prison.



FRONT OF THE PALACE OF GUADALAJARA.

Towards the commencement of the last century, Guadalajara reached a degree of opulence and activity unknown to the rest of Castile. Cardinal Alberini, struck by the fact that the wool which Spain produced in such abundance, and of such superior quality, should leave the kingdom at a low price, and return again at a higher cost, under the shape of cloths and other fabrics, determined to free Spain from this dependence upon foreign manufacturers. He invited several skilful Flemish manufacturers to settle in Spain, and planted them, with a small colony of workmen, in the castle of Ateca, a dependence of Aranjues. During the hot season the climate here is extremely unhealthy; and it was not long before these workmen, who were accustomed to a mild climate, were attacked by disease. In 1719, one year after their arrival in Spain, it was judged necessary to change their residence, and Guadalajara was chosen, for its healthy climate. Very large and flourishing establishments soon arose in this town. A large market was at once opened to *their manufactories. Spain at that time monopolised the import*ation of merchandise into the whole of its American possessions, and in a short space of time the fabrics produced by their manufactories not only rivalled the exports of the European continent, but even supplied the markets at a price considerably below that which the products of other countries were sold for.

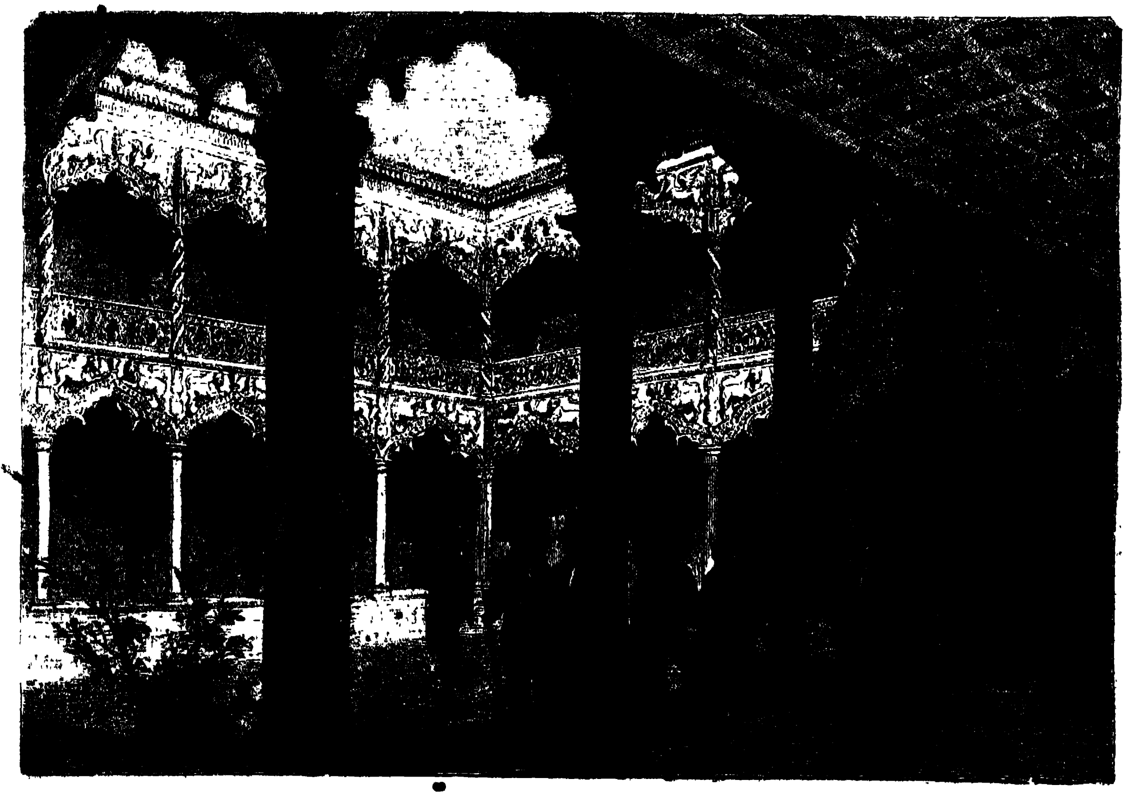
In 1757 the Spanish government ceded these factories to the Incorporated Cloth Merchants of Madrid for a period of ten years, with many privileges; but either through incapacity, or mismanagement, this undertaking was disastrous. The company, at the end of the ten years, declined to renew the contract, on account of the enormous losses. It was in vain that the government offered contracts to other persons; no one would undertake them; and it was compelled to take the manufactures again into its own hands. Immense sums of money were swallowed up by this attempt. During the time when the physical and chemical sciences were making rapid progress in the rest of manufacturing Europe, while new processes were being applied by weavers and dyers, the factory at Guadalajara remained perfectly stationary; the markets of the continent, even those of America, were closed against it, and the exports almost ceased. The invasion of 1808, however, put the finishing-stroke to its ruin. In 1826 a few enterprising speculators attempted to resuscitate the manufactory, but were entirely ruined, and since that time this once flourishing trade has been entirely abandoned at Guadalajara.

The only strangers who now visit Guadalajara are a few stray travellers or antiquaries, who, after having visited the church of San Ildefonso, and the tomb of Cardinal Misneros, both masterpieces of the sixteenth century, feel a desire to behold the celebrated palace of the Dukes of Infantado.

According to some authorities, this palace was built by Cardinal Mendoza, of the House of Infantado, who was born and died at Guadalajara. The general style of the edifice appears to favour this opinion. The façade is rather extensive, and in the manner *of decoration we recognise traces of the feudal age.* The balconies in the upper story, and the pillars on each side of the gateway, are evidently derived from the turrets and entrance towers of feudal castles. These are the precious characteristics of a transition state; and this palace of Guadalajara is one of the most perfect specimens. From some cause, which has never been satisfactorily explained, the gateway, as in many other palaces of the Spanish nobility, is not in the centre, but placed about two-thirds down the façade. Some writers have attempted to explain this as arising from a decree in feudal times, making the right of a centre gateway a royal privilege. This, however, is not supported by any reliable authority.

The interior of the palace has undergone great alterations. The habits of the last century could not agree with the distribution of apartments in the past ages, and casements of a comparatively modern style break the façade and the simplicity of the building. The joints of the stones are marked by diamond-shaped points. In the interior the court has also been subjected to the same description of alterations; the frigid Tuscan pillars produce a strange effect in contrast to the network of tracery above them. Besides this, one whole side of the upper gallery has been built in to form apartments for the household domestics.

Several rooms in this palace are ornamented with illuminated ceilings; others are divided into squares which are either gilt or brilliantly painted; the ground floor is inlaid with mosaic work in porcelain. Enormous chimneys, ancient furniture, remains of antique armour, are strangely contrasted with the modern decoration of some portions, and the silence which fills the palace. The most remarkable portion of this remarkable edifice is the so-called Gallery of Lineages, from the fact that the paintings with which it is ornamented represent the escutcheons of the principal families of Spain.* It extends along the whole of one side, but is not of a width proportionate to its length. The colossal chimney which occupies one of its extremities is a masterpiece of carving. The ceiling combines in a most happy manner the florid beauties of Saracenic art with the purer taste *of a later age. That which gave the distinguishing feature* to this gallery, was the profusion of gilding displayed on its walls, and an ancient writer not inaptly calls it, "*una ascua de oro*" (a brazier of gold). At the present time this gallery is used as a lumber-room, and many of its richest emblazonments have faded before the attacks of dust and cobwebs.



COURT-YARD OF THE PALACE OF GUADALAJARA.

It is said that Francis I., during his involuntary journey to Madrid, after the battle of Pavia, halted at the castle of Guadalajara, when the Duke of Infantado treated him with the utmost courtesy and magnificence. The duke was unable to attend the king during his visit to the Gallery of Lineages, owing to an attack of the gout, but instructed the Count de Tendilla, and the Marquis de Mondejar to do the honours to his royal guest and prisoner. A poet, Don Alonzo-Nunez de Castro, who was present, has rhythmically described this visit, and gives an enumeration of the various escutcheons which at that time decorated the walls. This poem, though insignificant as a literary composition, is yet of great value in an historical point of view.

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* A similar gallery is to be seen at the Castle of Cintra, near Lisbon.

The arms of Guadalajara represent a horseman armed cap-a-pie, and are said to perpetuate the memory of Alvar-Fanez de Minaya the nephew, lieutenant, and companion in arms of *Rodrigues de Bivar*, the celebrated *Cid Campeador!* Alvar fought valiantly with the Cid in the seventy-nine battles which the latter was engaged in with the Saracens, and freed Guadalajara from the yoke of the infidels.

SALT.

The chief use of condiments to food, or of those additions which impart flavour without increasing the nutritive qualities of it, is to stimulate digestion by pleasing the palate; and, provided the substance thus employed be not positively unwholesome, or do not stimulate the stomach too strongly, the use of condiments is decidedly beneficial. There is one condiment, however, which must possess qualities of a far higher kind, and must be absolutely necessary to render food perfectly adapted to digestion and assimilation, if we may judge by the universal use of it by all nations, by the craving felt for it by inferior animals, as well as by man, and by the diseases produced by absolute privation from it,—of course we mean salt.

The first remarkable circumstance attending salt is, that, with the exception of water, it is the only *mineral* substance that is consumed with, or for food, by animals. This fact would render it probable, if not certain, that its action on the constitution is entirely chemical, and not nutritive—that is, that salt either operates some change in the organic matter taken into the stomach, which causes it to be more readily and more completely converted into chyme, or else that, by mixing with the juices secreted from the organs of digestion, it increases their energy, but that the salt itself, or its constituent elements, is finally ejected, and does not permanently remain in the system.

Salt is hardly less important to man in an economic point of view. Its effects in retarding the putrefactive fermentation, or decomposition, of animal and vegetable matter, enable us to preserve food of many kinds for a much longer period than we otherwise could do.

Flesh is salted either by rubbing the salt dry into the meat, or by soaking it in *brine*, which is water saturated with salt dissolved in it. But this mode of application is limited to small pieces, and is not effectual for flesh which is to be kept for a long time.

A small proportion of saltpetre (nitrate of potash) is added to brine. Experience, we presume, has shown that the action of the liquid is improved by this addition; but we do not know in what way this improvement is effected.

Beef and pork, for taking to sea, or for winter store, must be salted by placing the pieces alternately with layers of dry salt, in barrels or chests, and keeping it in this state for a month or more, and even repeating the operation twice or thrice, if the meat is intended for ships about to proceed on distant voyages.

Bacon, hams of beef, mutton, or bears,—tongues of oxen and rein-deer, &c., after being salted in this manner, are *smoked* or *dried* by being hung up in the chimneys of fireplaces in which wood alone is burnt; and this wood must not be that of fir, or other trees of that order, because the meat would acquire a flavour of turpentine from the smoke of such wood.

Fish is preserved by salting, in such quantities as to constitute an important article of commerce among most civilised maritime nations.

It should be remarked, that all animal matter is rendered less digestible by salting, and the consequent drying. The fibre is made more tough, and the quantity of salt incorporated with the meat is greater than is beneficial to the constitution when taken into the stomach. Hence persons, like seamen, who feed much on salted provisions, are liable to scorbutic complaints, generally designated as the *scurvy*—the best remedy against which consists in fresh vegetable food, and especially in the use of fresh lemon-juice, or citric acid.

Salt is derived from two sources: extensive strata of this mineral, in some cases forming whole mountains, exist in many parts of the globe. These masses are excavated by means of mines, in the usual mode, and the produce is termed *rock-salt*.

There are salt-mines in France, Hungary, Poland, Spain, and at Northwich, in Cheshire. That at Wieliczka has been described by many travellers, as remarkable for its depth and extent, and for the curious chambers, stables, chapel, &c., into which the excavations have been converted, the furniture and fitting up being formed of salt. But that at Salzburg is still more interesting, from the mode employed in working it. Fresh water is brought by artificial channels into small chambers, excavated in the salt-rock; the water dissolves the salt of the sides, floor, and roof of this, till the space is enlarged as much as can be safely permitted, without risk of the roof falling in from the weight of the superincumbent mountains. Some of these chambers are immediately over one another, a sufficient thickness of rock being left between them to bear the weight of the water when let into the upper one. In such cases, the floor of the upper cavity is covered over with well-tempered clay, carefully spread over it, in order to prevent the liquid from dissolving the floor. When the water becomes saturated with salt, it is drawn off, and carried out of the mine by means of wooden troughs; the salt is obtained from the liquid by evaporation and boiling.

ANCIENT AND MODERN BRIDGES.

In the early ages of the world, bridges were unknown as a means of transit over rivers, and accordingly we not only find frequent mention of "fords" made in the bible, but also in many ancient historical and geographical works the same word occurs. The earliest structures of the kind were rude and simple, and we may form an idea of their appearance and stability from the flying bamboo bridges of the Indians, and the unpicturesque but strong wooden lintels which were stretched from bank to bank in the Orkneys and Hebrides. After these, piers or posts were fixed in the bed of the river, connected at the top by stone or wooden lintels; but this contracted the passage of the waters, and a strong current not unfrequently swept away every vestige of the rude structure, which had been the only mode of communication between countries lying on opposite sides.

Experience of the defects of an old system lead people to desire a new one, and accordingly without any great stretch of inventive faculty, the arch of the temple was transferred to the buttresses of the bridge, which were no longer placed in the channel of the river but on its banks.

The Chinese lay claim to high antiquity in the construction arched bridges. At Fou-tcheon there is a remarkable specimen of this description 1200 feet long, and about 36 feet wide. It had formerly a regular street built upon, with shores on both sides of the way. Another at Suen-tcheon-fou is 2,500 feet long, and 20 feet wide, and has 252 stone piers, on which is laid a roadway of huge stone blocks.

The Romans also were distinguished for many excellent specimens of bridge-building in various parts of the east and in Europe; but we learn from history, that others beside the Chinese and Romans were acquainted with this species of architecture many centuries ago. The stupendous wall of Babylon crossed the mighty river Euphrates on a series of arches, and the river which rolled its dark waters through the city of Nineveh was spanned by a fortified arch. Of all these bridges of antiquity, however, the most magnificent was that built by the Roman emperor Trajan across the Danube. It is described as consisting of twenty piers of squared stone, each of them rising 120 feet above the foundations, 60 feet in width, with a water-way between every two of 170 feet, which was consequently the span of the arch, so that the whole length of the bridge was nearly 1,500 yards. It was a noble structure, and in its ruins, which exist to this day, may be traced the bold ambitious character of its projectors, and the weak timorous mind of its destroyer, Adrian, who had it pulled down lest it should afford a passage to his enemies. The fine bridge of Nismes is also a Roman structure, and answers the double purpose of a bridge over the river Gardon; and an aqueduct for supplying the people of Nismes with water. This bridge consists of six arches of majestic proportions and extraordinary strength, and is 470 feet long. On this level is erected a series of 11 arches which are continued beyond the extremities of the bridge, and form a junction with a slope of the mountain on each side; over these is a third series of 35 arches, much smaller than those below, though 850 feet in length, and supporting a canal on a level with two mountains, along which the water is conveyed to Nismes by a continued aqueduct. This extraordinary edifice is built with very large stones, held together by iron cramps without cement, and is still in perfect preservation, a mighty monument of the resources, the perseverance, the magnificence of those great people, the ancient Romans, who have left, in almost every country in the world, imperishable evidences of their presence as rulers.

There is also another extraordinary Roman bridge in France; it spans the Loire near the old town of Brioude, with one arch, whose span is 181 feet. Its greatest height, from the level of the water to the intrados, is sixty-eight feet, and its breadth 13.

Old London-bridge was a wooden structure of the days of Henry II. (1176). Its nineteen arches and its street of shops were objects of curiosity and interest. With numerous alterations and patchings up, it remained in use till 1831. One by one its old adornments and peculiarities gave way before modern innovation, its narrow arches, not much broader than the windows of some Gothic aisle, gradually widened, the chapel of the "Unbelieving Thomas" was pulled down, a modern parapet usurped the places of the busy trading marts, and the Southwark Gate, where many a traitor's head blackened and rotted in the sun, no longer frowned upon the multitude who passed across.

The modern bridges across the Thames at the metropolis form noble specimens of bridge architecture and engineering; but those constructed in the last century—Westminster and Blackfriars bridges—have entailed heavy subsequent charges on account of the insufficiency of the foundations. The new London-bridge is built 180 feet higher up the river than the old one; it consists of five semi-elliptic arches, the centre arch being 152 feet wide, the rise above high-water mark 29 feet 6 inches. The whole length of the bridge is 928 feet, the roadway 53 feet wide between the parapets. It was commenced in 1824, and completed in seven years. Southwark-bridge was built by Rennie at a cost of £800,000. It is 718 feet between the abutments, and consists of three cast-iron arches. the span of the centre arch is 250 feet The weight of iron employed was upwards of 5,700 tons. Waterloo-bridge is nearly 400 yards long, a handsome granite structure, supported by nine elliptical arches of 120 feet span.

The first iron-bridge in England was erected in 1779, over the Severn, at Coalbrook-dale. It consists of a single arch of about 100 feet span. Bishop Wearmouth iron-bridge, completed in 1796, is a single arch of 240 feet span; and Sunderland iron-bridge, built about the same time, is 236 feet span.

In 1796 Mr. Finlay, an American, constructed an iron suspension-bridge in the United States. He afterwards obtained a patent, and erected a great number of similar bridges in various parts of America—one over the Schuylkill was 306 feet long. This probably originated the scheme which was proposed in 1807 by M. Belu, a French engineer, for crossing the Rhine between Wesel and Ruderich by a bridge about 820 feet long, to be supported by a network of wrought-iron chains.

In 1818 the Holyhead Commissioners applied to Telford for his opinion respecting the erection of an iron suspension-bridge at the Menai, a narrow channel about 17 miles in length, which separates the island of Anglesea from the mainland of Wales. The bridge was commenced August 10, 1819, and the mail-coaches drove over it for the first time January 30, 1826. The distance between the points of suspension is 560 feet, and the height of the carriage-way above high-water in the strait is 100 feet. The roadway of the bridge is divided into two carriage-ways, each twelve feet wide, with a footway four feet wide between them. The main chains are sixteen in number, with a deflection of 37 feet. The weight of the ironwork is 644 tons.

While the Menai bridge was in progress, the suspension pier at Brighton was constructed by Sir S. Brown. It consists of four openings of 255 feet each. In 1824 the Hammersmith suspension bridge was commenced, being the first erected in the vicinity of London. The Hungerford bridge was opened on the 18th of April, 1845. Perhaps the finest suspension-bridge ever constructed, is that built by Mr. Tierney Clark over the Danube, at Pesth. In extent and cost it exceeds all others; it was finished in 1849, and was shortly afterwards traversed by the Austrian and Hungarian armies.

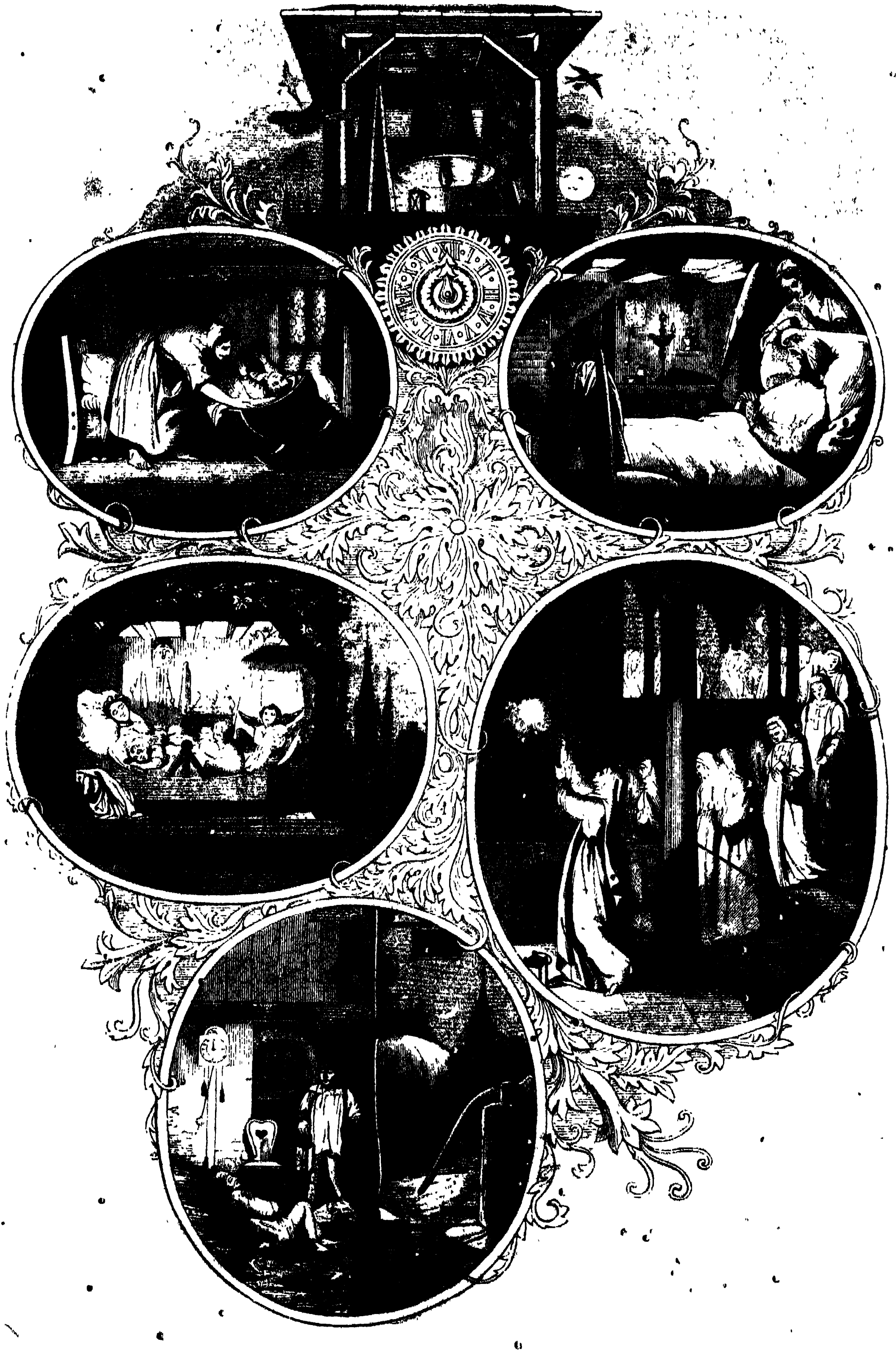
An ingenious modern contrivance is the floating-bridge contrived by Mr. Rendel in lieu of an ordinary steam ferry-boat, for which the current was found to be too strong, as a means of communication between Torpoint and the Cornwall shore, at the mouth of Plymouth harbour, and which has since been applied also to the harbours of Dartmouth, Portsmouth, and Southampton. It consists of a large flat-bottomed boat, the deck of which is adapted to receive horses and carriages, as well as foot-passengers, and which is propelled by means of wheels turned by a steam-engine mounted in the vessel. These wheels take hold of chains which are extended from shore to shore, fastened at both extremities, but allowed to hang under water in a festoon or curve. The chains which are not absolutely fixed at the ends, but are attached to very heavy balance weights, are [illegible] up by the vessel as it proceeds, and serve not only as an abutment to secure the progress of the vessel, but also to keep it in its right course.

Not long since public attention was directed to a new kind of bridge architecture, rendered familiar to the visitors at the Surrey Zoological Gardens as the Remington Aerial bridge. These bridges are formed entirely of thin pieces of wood, so light and thin that their ability to bear the weight of many persons at one time has been a matter of surprise. A bridge of this sort was erected over the Trent, and is 150 feet in span. But the most remarkable specimen of bridge building, unequalled perhaps in the world, is that which was erected by Mr. Stephenson for the Chester and Holyhead Railway—the *Britannia Tubular Bridge*. It consists of two tubes of iron placed side by side through which the up and down trains respectively pass. The whole length of each tube is 1516 feet, and the height above highwater-mark 102 feet. Each tube is formed of four pieces, which unite and rest upon the central pier built on the Britannia rock in the middle of the Menai Straits, on two towers on the shores of Anglesey and Caernarvonshire respectively, and on two abutments farther inland on each coast. There are, therefore, eight tubes in all; they are formed of plates of wrought iron strongly riveted together, the weight of the whole is 10,000 tons. On October 21, 1850, the tubes were opened for public traffic. During the five years between 1845 and 1850, the work had rapidly proceeded. At the latter end of June in the former year the bill sanctioning the Britannia Bridge was passed in parliament. In July the preliminary experiments were made; in April, 1846, the first stone of the Britannia tower was laid; in June, 1847, the first vessel arrived with iron in the strait; on May 1, 1849, the first tube was completed, and platform cut away; in June, the first tube floated; in November, the first tube was deposited in its permanent bed; December 4, the second tube floated; February 7, 1850, second tube deposited on permanent bed; March 3, Caernarvon small tube lowered; March 5, the first engine passed through the tube, and the last rivet was inserted; March 18, the single line of tube was opened for the public traffic; on June 10 the third tube of the second line was floated; July 11, third tube deposited; on the 25th of July the last tube was floated, and in less than three months the bridge was finally completed and opened for public use.

It is interesting to look on the works of man; every creation of art, every triumph of engineering, every new invention, every great discovery, every mechanical contrivance, has its own peculiar lesson, and the greater the work achieved the deeper and more solemn the lesson becomes, teaching us in its own strong, earnest manner the power of mind over matter.

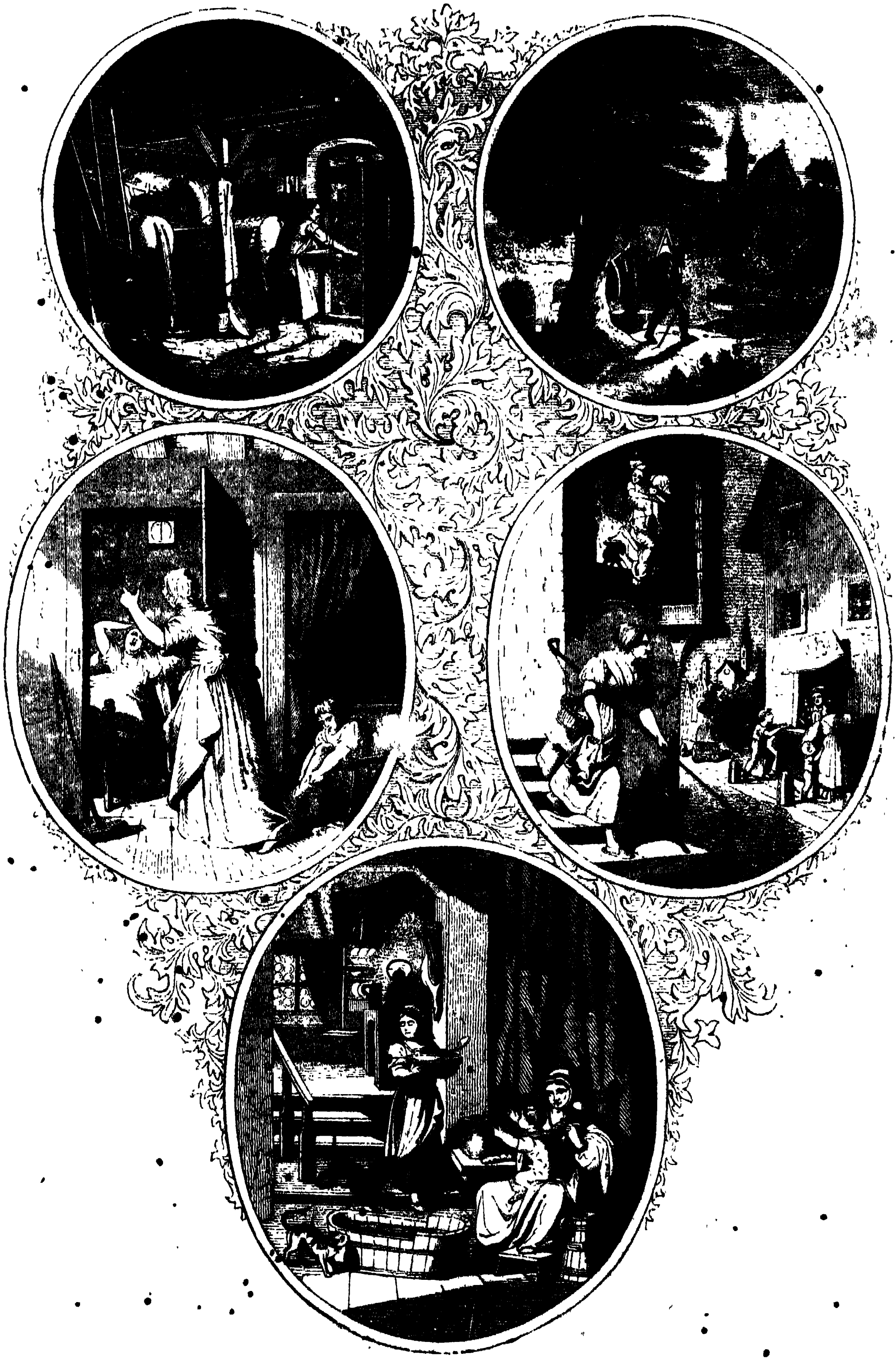
In these latter days our public works may not be so stupendous as some of the great monuments of antiquity, but as long as they last their uses will be apparent,—monuments of our power, and wealth, and glory, when our empire has passed away, and when our conquests are forgotten. We are not so prolific in works of beauty as many of our neighbours, but in the useful, none can rival us. The Menai bridge is a better exponent of the genius of the Saxon race than all the books that have ever been written.

THE NURSE'S CLOCK.



THE HOURS OF THE NIGHT. DRAWN BY FREEMAN.

One of the best collections of the popular songs of Germany is that published by M. C. Brentano, entitled *Des Knaben Wunder Horn*, "The Child's Magic Horn." This appellation, singular as it may seem, fully expresses the character of the work, it is in fact a sort of poetic *mélange*, filled with touching romances, ballads of chivalry, old melodies, traits of the religious belief



THE HOURS OF THE NIGHT. DRAWN BY FREEMAN.

the people in the older time, war-cries, &c. It is, in truth, a faithful picture of old Germany, and the faithful echo of sentiments which for many a century softened the hearts of children, lightened the labours of the day, and made merry the winter fireside.

We have chosen from this collection a little piece, called the

Nurse's Clock, which has been illustrated by an able artist. The good woman is supposed to be sitting by the cradle, and singing to her little charge what happens each hour during the night.

"The moon is rising. The child cries. The clock has struck *twelve*. God be merciful to the sick and the afflicted.

"God knows all things. The little mouse runs about. The clock strikes *one*, and dreams flit around the ear.

"The nuns prepare for matins. The clock strikes *two*. The nuns assemble in the church.

"The wind blows; the cock crows. The clock strikes *three*. The carrier gets up from his straw bed.

"The horse neighs. The door of the stable opens. The clock strikes *four*. The carter brings corn to the manger.

"The lark sings; the morning dawns. The clock strikes *five*; and the traveller sets out on his journey.

"Run to the baker's and buy white bread.

"The hen cackles. The duck flaps her wings. The clock strikes *six*. Get up, you lazy girl.

"The clock strikes *seven*. Put the saucepan of milk on the fire.

"Get the butter and the sugar. The clock strikes *eight* Make haste, and bring the child its breakfast."

WRITING MATERIALS.

It is estimated that there are 587 languages and general dialects in Europe; 937 in Asia; 226 in Africa; and 1,264 in America;—in all, nearly 3,000. The transitions of languages have been referred sometimes to an indefinite antiquity, sometimes to distinct races of men. Moses, our oldest historian, refers the matter to Babel building upon Shinar's plain. Careful examination substantiates this statement. There are in all languages one great primary origin. Powers of voice are as natural to man as to animals and birds. Monosyllables are the primitive sounds, and syllabic compounds are the result of interchange with other nations. Hence all the fundamental tongues are monosyllabic as to generic ideas and compound species and varieties. The Sanscrit, Chinese, Welsh, Greek, Hebrew, and German, are formed on this principle.

The Chinese have 214 radical words and signs to represent them; out of those by synthesis other words are formed. It has been computed that there are 20,000 words in Spanish; 25,000 in Latin; 25,000 in English; 30,000 in French; 45,000 in Italian; 50,000 in Greek; and 80,000 in German. There are 1,700 radical words in Hebrew.

Speech itself is one of the greatest marvels of man's nature. To utter thought, to communicate ideas, is as wonderful as it is useful. Without speech man's knowledge would be of little use to him. He might think, and feel, and reason, but it would be only for himself. Gigantic intellect might grasp the whole race of human knowledge, but those acquisitions must die away unuttered. Our pious fathers feeling well the importance that lay in the speaking of man to man, founded places where men could teach, when as yet teaching by the voice was the sole method of instruction. Universities arose while there were yet no books procurable, when a man for a single book had to give an estate of land. However great and wonderful the power of speech, something more was required for a world's population,—and writing, a second kind of speech, was the gift desired and the gift bestowed.

It was an epoch when contemplative man first began to represent sounds and ideas by signs. It was something to design thought by a rough outline picture, but something more when these rude hieroglyphics were abbreviated into current written characters.

The alphabets of different nations contain the following letters: English, 26; French, 23; Italian, 20; Spanish, 27; German, 26; Sclavonic, 27; Russian, 41; Latin, 22, Greek, 24; Hebrew; 22; Arabic, 28; Persian, 32; Sanscrit, 52; Chinese, 214.

In the most ancient times, writing was used for great occasions only, and then a rock, a tablet of stone, or a plate of metal was the receptacle. The Decalogue was written on tables of stone Job desired that his words might be written with an iron pen and lead in the rock. The works of Homer and Hesiod wer first written on plates of lead, and many ancient documents or copper, of considerable extent, are still met with in India. Th use of the tablet stone is still familiar, and the sculptured work of the north of Europe show the practice of consigning records to this imperishable material to have been frequent amongst ou ancestors of the ninth and tenth centuries.

By the Egyptians, and probably by the Greeks, leaves of trees were used, and of the papyrus-shrub paper was manufactured A.C. 700. The leaves of some Asiatic trees are, from their size and smoothness, so admirably adapted for books, that the cheapness and beauty of European paper has not been able entirely to supersede their use. If we may judge from the name *leaf* being still applied to paper books, we should fancy these leaves to have been formerly the article chiefly in use.

Some persons are of opinion that the first writing was upon thin pieces of wood, so that a *billet-doux* was something like an ordinary trencher; but the idea itself is not at all unlikely. Boards were used at an early period by the Greeks and Romans These boards were covered with wax, but as this was easily obliterated such writing was only used for temporary purposes In one of the comedies of Aristophanes, a debtor proposes to elude the payment of a debt by melting with a burning-glass the wax which bore the record of the debt. The writing was drawn with a steel point upon the surface of the white wax, and the scratches were then filled up with a black substance to render the writing more legible.

According to Pliny, the Romans sometimes used linen cloth to write upon, and remains of such a practice, as in use among the Egyptians, have been very often found in unrolling mummies. But to write on linen it was necessary to paint upon it with some coloured liquid, which would get dry and leave a permanent mark. This gave rise to the invention of pen and ink, the first ink used was probably composed of soot, or lampblack, mixed with size or gum and water. This description of ink, though less fluid and more difficult to write with than our ink in common use, possesses very great advantages, resisting chemical action and being unalterable in colour. A reed or bulrush, was cut into the form of a quill, and used as a pen. The quill appears to have been first in use about the year 600. The word *penner*, meaning a quill, is not found in any work older than that period. The quill has an advantage over the reed, in being finer and more durable. Instances are not rare, in which a quill pen has served its owner for years. P. Holland, the translator of Pliny, completed that work with a single pen; which fact he records in oft-quoted doggrel:—

> "With one sole pen I wrote this book,
> Made of a grey goose quill;
> A pen it was when I it took,
> A pen I leave it still."

Leo Allatius used the same pen for forty years, and did not wear it out then: he lost it, and bewailed the loss as of a tried and faithful friend.

The skins of animals were another and very ancient material for writing upon. Very ancient copies of the Scriptures are preserved written on parchment dyed red. The invention is generally ascribed to Eumenes, king of Pergamus, who reigned more than two thousand years ago. He was the founder of an extensive library, into which the new manufacture was largely introduced. Parchment volumes were commonly rolled on a round stick, with a ball at each end, and the composition began at the centre. These were called volumes, and the outsides were inscribed just as we now letter books. The Greek MSS. in Herculaneum, consist of papyrus, rolled, charred, and matted together by the fire, and are about nine inches long, and one two, or three inches in diameter, each being a volume or separate treatise.

Cotton and silk papers were in use at an early period, but linen rags were not used till A.D. 1200. This invention has been placed earlier by some good authorities, but it would appear that they have confounded the cotton with the linen paper. The first paper-mill was erected in England towards the end of the sixteenth century.

The means which have been employed for the dissemination of knowledge, the feebleness of verbal instruction for the wants of man, the scanty means afforded by the art of writing, when the business of transcribing was so laborious and expensive, and the blessing to the world which came when printing and ready writing sent forth its thousands of copies to a knowledge-seeking people, when knowledge was no longer a forbidden fruit, but free alike to all, when not only the few but the many, became possessed of all the rich and varied treasures it affords, are the business of the historian.

NEGRO SLAVERY.

THE tribute which Great Britain has paid to the genius of humanity, by her efforts and sacrifices for the abolition of the African Slave Trade and Negro Slavery, is the Englishman's proudest boast. Half a century ago, Curran said, "I speak in the spirit of our constitution, which makes liberty commensurate with and inseparable from our soil; which proclaims even to the stranger and sojourner, the moment he sets his foot upon our native earth, that the ground he treads is holy, and consecrated by the genius of universal emancipation. No matter in what language his doom may have been pronounced; no matter what complexion, incompatible with freedom, an Indian or an African sun may have burnt upon him; no matter in what disastrous battle his liberty may have been cloven down; no matter with what solemnities he may have been devoted on the altar of slavery: the first moment he touches our sacred soil, the altar and the god sink together in the dust; his soul walks abroad in her own majesty; his body swells beyond the measure of his chains that burst around him; and he stands redeemed, regenerated, and disenthralled by the irresistible genius of universal emancipation." This statement is far more true in our days than it was fifty years ago, thanks to the services and victories of Sharpe, Clarkson, Wilberforce, Stephens, Brougham, Macaulay, Buxton, Cropper, Gurney, Knibb, Sturge, O'Connell, and others, fellow-labourers in the good work of slavery abolition.

In the year 1824 an English cruiser gave chase to a slaver on the coast of Africa. It was "*La Jeune Estelle*," commanded by Captain Olympe Sanguines. During the pursuit several hogsheads were seen to float past the English cruiser; these, however, did not attract much attention, as it was supposed that the slaver was throwing overboard her water-casks in order to hasten her escape. Upon boarding the "*Jeune Estelle*," the English were unable to discover any slaves, although every appearance indicated that the ship had lately been tenanted by those unhappy beings; and upon examination they found concealed in a large hogshead, two negresses about fourteen years of age. All was explained. The hogsheads which they had observed had contained the negroes, and by thus casting them into the sea, the evidence of guilt had been destroyed.

The exhibition of the irons with which the negroes were confined, excited the deepest horror, not only in England, but in France and other lands; the statements which were made, and the evidence adduced on this and similar occasions, aroused public indignation and enlisted public sympathy. Before the French legislative assembly, it was stated that negroes on board slavers were confined in less space than was given *to a dead man in the grave.* Such doings were not rare. The very means which were employed for the repression of the trade only rendered the transport of the slaves more fearful as it became more hazardous; the vessels in which they were conveyed well deserved the name of "floating coffins," which had been bestowed upon them, the fear of detection and punishment inciting the slave-dealers to fresh crimes. The case of "*La Jeune Estelle*" was only one of many slave-traders which, when hard pressed, cast their living cargo overboard. Our engraving represents such a scene.

Every expedition in the trade was attended by a series of horrors repugnant to humanity; the negro was seized and marched with his captors to the coast and there detained until they would secretly place him on board their vessels. The cupidity of the negroes themselves was excited, and they would sell one another, and on the common average it was stated that every slave cost three lives in the struggle of his capture or betrayal.

In the interior of the slave ship the negroes were arranged with the most cruel economy of space. Men, women, and children were chained together, two and two, by the hands and feet, and kept thus for months upon the African coast until the requisite number of slaves could be obtained for a profitable cargo.

Upon arriving at their place of destination, they were exposed for sale in the public markets. A new series of calamities and miseries then commenced, the separation of relations, the husband from the wife, and the mother from her child, were followed by the severest and most unremitting toil, rendered still more unendurable by the cruelty of those who were the drivers, or middle men, between the owners and the slaves.

Such a state of things needed, and produced something more than sympathy. "True humanity consists not in a squeamish ear; it consists not in starting or shrinking at tales such as these, but in a disposition of heart to relieve misery. True humanity appertains rather to the mind than to the nerves, and prompts men to use real and active endeavours to execute the measures which it suggests."

The importation of fresh negroes from Africa to our colonies was declared illegal in 1807. This victory was only gained by a twenty years battle. Whilst, however, the British slave-trade had been abolished, British slavery remained. Though no fresh importations could be received in our dependencies, the negroes who were there remained in bondage, and England, rejoicing in her liberty, had a slave population in the West Indies. Public sentiment was gradually enlisted, till in 1823 it had become sufficiently aroused to cause the passage in Parliament of Mr. Canning's celebrated resolutions, declaring the expediency of adopting decisive measures for ameliorating the condition of the slave population in the colonies preparatory to their complete emancipation. A ministerial circular was sent to the colonies, directing the authorities to act upon these resolutions in the future treatment of the slave population; but these circulars were either contemptuously defied or coolly disregarded.

Towards the close of the year, the negroes, who had heard of the order in council, and fancied that "the great king of England" had set them free, refused to work. Compulsion was resorted to—they resisted—martial law was declared, and pressed down and running over was the measure of vengeance dealt to the unhappy slaves. Above one hundred fell in the field, forty-seven were executed, and ten torn to pieces by the lash,—being condemned to receive from five hundred to one thousand lashes. The infuriated planters endeavoured to trace the origin of the revolt to a venerable English missionary, the Rev. John Smith, who was tried, convicted, and sentenced to death, but died before the day of execution. This attempt to

> ———" bring back
> The Hall of Horrors and the assessor's pen,
> Recording answers shriek'd upon the rack,"

produced a powerful effect in England, and the missionary Smith's case became a rallying-cry.

The liberal tendencies of the years 1830-1 were peculiarly advantageous to the abolitionists, and they gathered strength by agitating the country through numerous publications and addresses. The outbreak in Jamaica, the destruction of the chapels and meeting-houses, and the exile of the missionaries, stirred the national heart to its core. Parliament could not be insensible to the popular voice—a committee was appointed to consider the expediency of abolishing slavery in the islands. Mr. Buxton was chairman of that committee. The inquiry extended over three months. The result condemned slavery; and at the fetters of the slave a blow was at length struck, which would make them fall off his limbs for ever.

Mr. Stanley brought out the government plan of abolition. It bore the stereotyped ministerial stamp. It was a compromise between what justice demanded and oppression would grant. It immediately emancipated all slaves under six years of age; and subjected house servants to an apprenticeship of four years, and agriculturists of six to their former masters; and gave to the latter a compensation of £20,000,000. At the end of the apprenticeship the negroes were to be completely free. The scheme was warmly denounced; the bill however became law on August 28th, 1833. Antigua and the Bermudas discarded the apprenticeship and adopted complete abolition, the act giving to the colonies the alternative. Time showed the wisdom of their choice. They avoided the interminable disputes between masters and apprentices, and by the change reaped all the good fruits and none of the bad.

A numerous convention of delegates met in London in 1837; resolved that the apprenticeship should cease on or before August the 1st, 1838. They memorialised government; seven hundred thousand women presented their prayer to the Queen. Parliament began to move. While the agitation was going on, a ministerial despatch appeared in the West India papers, urging upon the colonies to do that for themselves, which the people of England would otherwise compel them to do. One after another the smaller islands yielded to the ministerial solicitation; then came Jamaica with her 330,000 apprentices. This settled the question. Ministers pledged themselves that all should be completed on the required day. On the 1st of August, 1838, the friends of emancipation assembled in all parts of the empire to thank God for the final overthrow of British negro-slavery.

Would that slavery, the wide world over, had ended then—that, looking over the broad Atlantic, we saw nothing but liberty under the standard of the Stars and Stripes; that nowhere beneath the great blue vault of heaven "God's image, cut in ebony," was kidnapped, and worked, and lashed, and killed by the "devil's image cut in ivory." America, the land of the brave and the free, owns slaves! From the last American census, it appears that there are 3,179,589 slaves in the United States. There are 113,000 slaveholders. It is estimated that the number of fugitive slaves amounts to 50,000; and the recent fugitive slave law, which overrides the safeguard thrown around them by the more humane legislation of the free states, subjects every one of these unhappy persons to capture, and, by a summary process, hands them over to their old owners or their representatives.

Men who have been free for years, and safe in a free state, are thrown into the greatest alarm and perplexity, and are looking about for places of refuge. Some have found their way to England, many have fled to Canada, and those who, by honest industry, have been able to obtain a comfortable homestead, have been compelled to sacrifice all for a trifling consideration, in order that they may secure their liberty by flight. The Fugitive Slave Law denies the privilege of trial by jury to the slave. "A human being," says Judge Jay, "is stripped of every right, and reduced to the condition of a vendible beast of burden, with less ceremony, and with more celerity than one neighbour can recover of another the value of a pig in any court of justice."

How long will the land of liberty let this go on? Of the thirty-one states which form the Union, there are sixteen states in which slavery is contrary to law, and fifteen slave-holding states. How long will America delay what must come at last,—that which the age demands, and the justice of the case requires,—that the slave may possess his rights, and have his liberty without stint; and the beautiful lines of Montgomery be as true with regard to America as they are of England:—

CAPTURE OF A SLAVER.

"Hie to the mountains afar,
All in the cool of the even,
Led by yon beautiful star,
First of the daughters of Heaven.

Sweet to the slave is the season of rest;
Something far sweeter he looks for to-night;
His heart lies awake in the depth of his breast,
And listens till God shall say, 'Let there be light!'

Gaze ye awhile from this peak,
Praying in thought while we gaze,
Watch for the dawning first streak,—
Prayer then is turned into praise.

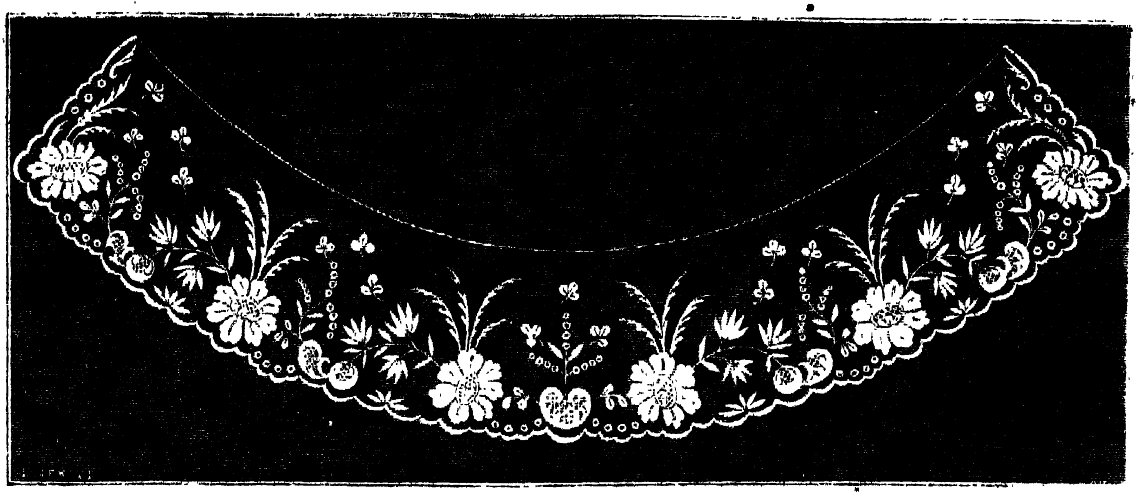
Shout to the valleys, 'Behold ye the morn,
Long, long desired, but denied to our sight!'
Lo, myriads of slaves into men are new born:
The word is omnipotent, 'Let there be light!'"

THE LADIES' DEPARTMENT.

COLLAR EMBROIDERED IN SATIN STITCH.

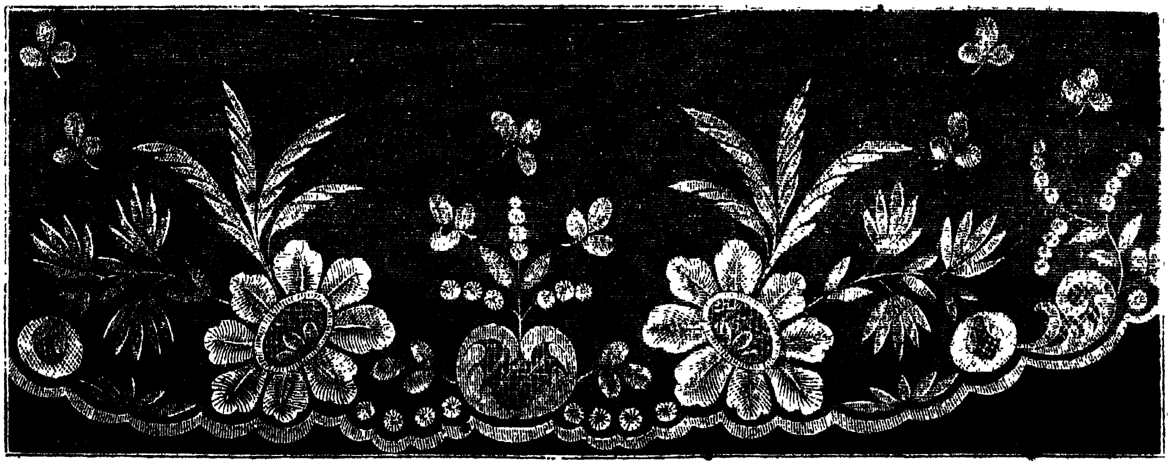
Materials.—A piece of fine French cambric, and the best embroidery cotton.

This pattern, of which we give half the full size, is to be traced from the engraving, and marked on cambric, in the manner already described in our Instructions in Embroidery. Every part is then traced with the finest embroidery cotton, great care being taken to preserve the delicate forms of the leaves and other parts.


COLLAR EMBROIDERED.

The edge is worked in graduated overcast stitch, the scallops being wider in proportion as they are larger.

The leaves are in plain raised satin-stitch, the points being marked with extreme accuracy. The small shamrocks with which the plain part of the collar is spotted, have an outline thread surrounding each leaf, very neatly sewed over. The petals of the flowers are also worked in raised satin-stitch, leaving the vein to be sewed over, and a series of very small spots to mark the outline of each petal. The round spots seen in the border, and in the sprays, are made by piercing a very small hole, with a stiletto, and working round it, slipping the needle through it at every stitch. The centres of all the flowers are all done in open stitches. These are formed by making small holes in the cambric with the needle, and working the bars of cambric between them. A variety in the appearance of the stitches is produced by leaving all the holes open, or by closing up every second or third row with a small cross-stitch.


COLLAR EMBROIDERED IN SATIN STITCH.

WINTER DRESS FOR A CHILD OF TWO YEARS.

Materials.—Half a pound of four-thread white Berlin wool, and one ounce of four-shade crimson; steel knitting-needles with heads, Nos. 11 and 13. Three yards narrow crimson ribbon. Select the wool, if possible, in ounce skeins.

For the Skirt.—Cast on 451 stitches on one of the coarse needles with white wool; knit 3 plain rows, join on the lightest shade of crimson, knit 3 rows plain.

4th coloured row. Knit 2 ×, make 1, knit 2 together ×, repeat to the end, knit 1 plain.

5th coloured row: Plain knitting, join on next shade and repeat these 5 rows.

Join on third shade and do the same.

Join on the darkest and do the same pattern twice, do 5 similar rows with each of the other 3 shades, ending with the lightest.

Join on the white wool; × knit 2, purl 1, and without taking the thread back slip 1, knit 1, pass the slip stitch over; × repeat to the end of the row, finish with 1 plain, knit backwards and forwards in this way till sufficient is done for the length of skirt, and cast off. About 7 inches will be found sufficient.

For the Body.—With the finest needles cast on 116 stitches in white wool, knit one plain row, join on the lightest crimson; knit 2 ×, make 1, knit 2 together, × repeat to the end, knit 1 plain row.

Join on the next shade.

1st pattern row: Knit 5, × purl 1, then without taking the thread back slip 1, knit 1, pass the slip stitch over, knit 1, × repeat to the end, and finish with 3 plain stitches.

Do another row with the same shade, 2 with the next, 4 with the darkest, 2 with each of the next two shades, and 1 of the lightest. On doing the second row of the lightest knit 5 stripes, cast off 4 *very loosely*, knit 9, cast off 4 more, and knit the remainder as usual.

Join on the white, and knit like the preceding, casting on the same number of white where the coloured were cast off. Knit from three to four inches in the same pattern and cast off.

For the Sleeves.—Cast on 32 stitches with white wool, knit 1 white row, and then a stripe like that at the top of the body. Then join on the white and do about an inch without decreasing. Knit 10 rows more, decreasing 2 stitches at the beginning of every row. Cast off. Sew up the sleeves, making the seam on the right side of the crimson stripe, in order that it may be turned up over the white, and sew them into the arm-holes.

Connect the body and skirt by a band of linen tape an inch and a half wide. Run a ribbon through the open hem at the top, and put 2 strings on the back. Button the band, and finish with a very broad sash of crimson ribbon.

THE HUMAN HAND.

In that portion of the works of Galen which bears this title, "On the Use of the various Parts of the Body," after having defined what is to be understood by the term *part*, or *member*, as applied to an animal body, he proceeds in the following manner:—

"But all these parts of the body were made for the use of the soul,—that sentient and intelligent principle which animates the body, and of which the body is merely the organ; and on this account the component parts of animals differ according to the nature of this principle. for some animals are bold and fierce; others are timid and gentle; some are gregarious, and co-operate for their mutual sustenance and defence; others are solitary, and avoid the society of their fellows; but all have a form or body accommodated to their natural dispositions and habits. Thus, the lion has powerful fangs and claws; the hare has swiftness of foot, but in other points is defenceless. But to man, the only animal that partakes of Divine intelligence, the Creator has given, in lieu of every other natural weapon or organ of defence, that instrument, *the hand;* an instrument applicable to every act and occasion, as well of peace as of war. Man, therefore, wants not a hoof, or horn, or any other natural weapon; inasmuch as he is able with his hand to grasp a much more effective weapon,—the sword, or spear. Besides which, natural weapons can be employed only in close conflict; while some of the weapons employed by man, as javelins or arrows, are even more effectual at a distance. And, again, though man may be inferior to the lion in swiftness, yet by his dexterity and skill he breaks into his use a still swifter animal,—the horse; mounted on whose back, he can escape from, or pursue the lion, or attack him at every advantage. He is enabled, moreover, by means of this instrument, to clothe himself with armour of various kinds, or to intrench himself within camps or fenced cities. Whereas, were his hands encumbered with any natural armour, he would be unable to employ them for the fabrication of those instruments and means which give him such a decided advantage over all the other animals of creation.

"Nor have we yet enumerated the most important of those privileges which the hand imparts to man. With this he weaves the garment that protects him from the summer's heat or winter's cold; with this he forms the various furniture of nets and snares, which give him a dominion over the inhabitants as well of the water as of the air and earth; with his hand he constructs the lyre and lute, and the numerous instruments employed in the several arts of life; with his hand he erects altars and shrines to immortal gods; and lastly, by means of the same instrument, he bequeaths to posterity, in writings, the intellectual treasures of his own divine imagination."

Let us, then, scrutinise this member of our body, and inquire not simply whether it be in itself useful for all the purposes of life, and adapted to an animal endued with the highest intelligence, but whether its entire structure be not such, that it could not be improved by any conceivable alteration.

In the first place, it possesses, in an eminent degree, a leading quality of an organ of grasp, since it readily applies itself to, and securely holds, bodies of every form and size that are capable of being moved by human strength. Nor need we inquire whether it be better for this purpose that it should be divided into several parts, or that it should be altogether undivided; for is it not apparent, without further reasoning, that, had it been undivided, it could have grasped only just such a portion of every object presented to it as was equal to itself? but that, being divided into many parts, it can both easily grasp bodies much larger than itself, and can accurately search out, and lay hold of, the smallest particles of matter; for to the former, it is capable of applying itself so as to encompass them by the separation of the fingers, while, in laying hold of very minute objects, the entire hand is not employed, but only the tips of two of the fingers, because from the grasp of the whole hand minute objects would easily escape.

Thus, then, the hand is framed in the manner the most convenient for laying a firm hold on objects both greater and less than itself. And in order to enable it to apply itself to objects of various shapes, it is evidently most convenient that it should be divided into many parts, as it is, and seems to be better constituted for this purpose than any similar instrument; for it not only can apply itself to substances of a spherical form, so as to touch them with every part of itself, but it also can securely hold substances of a plane or of a concave surface; and, consequently, it can hold substances of any form.

And, because many bodies are of too great a size to be held by one hand alone, Nature has, therefore, made each hand an assistant to its fellow; so that the two, when together laying hold of bodies of unusual bulk, on opposite sides, are fully equivalent to a single hand of the very largest dimensions; and, on this account, the hands are inclined towards, and in every point are made equal to, each other, which is at least desirable, if not necessary, in instruments intended to have a combined action.

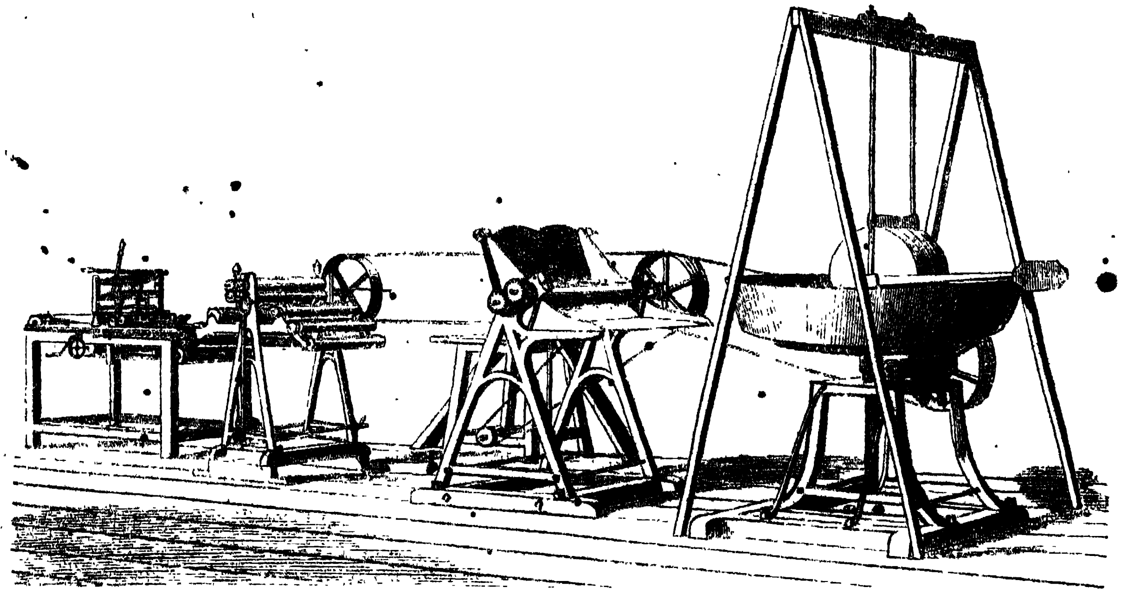
Take, then, any one of those unwieldy bodies which a man can only lay hold of by means of both his hands—as a millstone or a rafter; or take one of the smallest objects, as a millet-seed, or a hair, or a minute thorn; or, lastly, reflect on that vast multitude of objects of every possible size, intermediate, to the greatest and the least of those above mentioned, and you will find the hands so exactly capable of grasping each particular one, as if they had been expressly made for grasping that alone. Thus the smallest things of all we take up with the tips of the fingers; those which are a little larger we take up with the same fingers, but not with the tips of them; substances still larger we take up with three fingers, and so on with four, or with all the five fingers, or even with the whole hand; all which we could not do were not the hand divided, and divided precisely as it is. For, suppose the thumb were not placed as it is, in opposition to the other four fingers, but that all the five were ranged in the same line,—is it not evident that in this case their number would be useless? For, in order to have a firm hold of anything, it is necessary either to grasp it all round, or at least to grasp it in two opposite points; neither of which would have been possible if all the five fingers had been placed in the same plane: but the end is now fully attainable, simply in consequence of the position of the thumb, which is so placed, and has exactly such a degree of motion, as, by a slight inclination, to be easily made to co-operate with any one of the four fingers. But it is not merely necessary in laying hold of minute objects to employ the extremities of the fingers opposed to each other, but that those extremities should be exactly of the character they are,—namely, soft and round, and furnished with nails; for, if the tips of the fingers were of bone, and not of flesh, we could not then lay hold of such minute bodies as thorns or hairs; or, if they were a softer and moister substance than flesh, neither then could such small bodies have been secured. For, in order that a body may be firmly held, it is necessary that it be in some degree infolded in the substance holding it, which condition could not have been fulfilled by a hard or bony material; and, on the other hand, a material too soft would easily yield to substances of which it attempted to lay hold, and would continually let them escape; whereas the extremities of the fingers are just of that intermediate degree of consistence which is calculated for their intended use.

But, since tangible substances vary much in their degree of hardness, nature has adapted the structure of the extremities of the fingers to that circumstance; for they are not formed either entirely of flesh, or of the substance called nail, but of a most convenient combination of the two; thus, those parts which are capable of being mutually brought in opposition, and which are employed in feeling for minute objects, are fleshy; while the nails are placed externally, as a support to the former. For the fingers are capable of holding soft substances, simply by the fleshy or soft part of their extremity; but they could not hold hard substances without the assistance of nails; deprived of the support of which the flesh would be forced out of its position. And, on the other hand, we could not lay hold of hard substances by means of the nails alone; for these being themselves hard, would easily slip from the contact of hard bodies.

Thus, then, the soft flesh at the tips of the fingers compensating for the unyielding nature of the nails, and the nails giving support to the yielding softness of the flesh, the fingers are hereby rendered capable of holding substances that are both small and hard. And this will be more evident, if you consider the effect of an unusual length of the nails; for where the nails are immoderately long, and consequently come in contact with each other, they cannot lay hold of any minute object, as a small thorn or hair: while, on the other hand, if, from being unusually short, they do not reach the extremities of the fingers, minute bodies are incapable of being held, through defect of the requisite support: but if they reach exactly to the extremities of the fingers, they then, and then only, fulfil the intention for which they were made. The nails, however, are applicable to many other purposes besides those which have been mentioned, as in polishing and in scraping, and in tearing and peeling off the skin of vegetables or animals· and in short, in almost every act where nicety of execution is required, the nails are called into action.

PATENT BISCUIT-MAKING MACHINE.

In the city or at the railway-station, the man of business—too busy to sit down to eat, and too hungry to wait till dinner-time—seizes half a dozen little biscuits, thrusts them in his pocket, and munches them as he converses on 'Change, or is whirled along the iron way at the rate of forty miles an hour! The question of how those nice little biscuits are produced at so cheap a rate, never enters his mind. Why should it? The price of stocks and French rentes, or the quantities of cotton imported from America, are far more interesting topics. But to those who sit at home, and are anxious to understand these things, the question of the how and the wherefore assumes an entirely different complexion. To readers of this class, the brief explanation we are enabled to give of the machinery by which these little biscuits are produced will not prove valueless. A glance at the engraving will assist both them and us; and as it does not at first sight appear how such a combination of machinery can be made to prepare the dough at one end, and produce the biscuit quite ready for the oven at the other, we will endeavour to explain. The flour and other materials are first put into the pan at the right hand of the engraving, where they are thoroughly mixed with water till the substance assumes a slightly doughy form. It is then passed to the "breaking machine," where it is kneaded or masticated till it has become sufficiently tenacious to be passed through rollers. From these rollers,—the third machine in the engraving,—where the dough has been pressed and brought into a sheet of tolerable thickness, it is conveyed to the adjusting cylinders which further reduce it to the required thickness of the future biscuit. The material in the form of a continuous sheet of dough, is then passed on an endless band of canvas, to the last machine, where it is cut into shapes, docked, crimped, and stamped. The biscuits are now divided from the waste dough and carried to the oven to be baked, and in a short time they are ready to be eaten by the busy merchant aforementioned, or any others who choose to buy. The waste dough is afterwards collected, passed through the cylinders, and made up into biscuits as before. The machine, or rather series of machines, may be driven by either hand or steam-power, and only require the attendance of one man. Biscuits made by machinery will keep in a fresh and wholesome state for half a dozen years. The navy and merchant services are supplied almost entirely with a much better kind of biscuit than was common in the days of Nelson and Collingwood; and a large export trade is carried on with various parts of the world. Messrs. Barrett & Co. were the only exhibitors in the Crystal Palace of biscuit-making machinery, though biscuits of various kinds were shown from France, Portugal, Canada, and Van Diemen's Land.



MESSRS. BARRETT, EXALL, AND ANDREWES' BISCUIT-MAKING MACHINES, READING, BERKS.

Two ingenious models of bread-making machines—one by an Englishman, and the other by a Frenchman, were shown, while Mr. Boelstler, a Swiss artisan, exhibited a clever little contrivance for cutting bread into slices, thick or thin, and all ready for buttering!

THE VESPER BELL.

> Ave Maria! blessed be the hour,
>   The time, the clime, the spot, where I so oft
> Have felt that moment in its fullest power
>   Sink o'er the earth so beautiful and soft,
> While swung the deep bell in the distant tower,
>   Or the faint dying day-hymn stole aloft,
> And not a breath crept through the rosy air,
> And yet the forest leaves seem'd stirr'd with prayer."
>
> BYRON.

It is rather difficult to convey to the mind of the English reader, who has never been in Italy, a just conception of the passing beauties of the evening hour in that splendid climate. In these cold, northern latitudes day fades so insensibly into darkness, that our attention is scarce called to the transition. But in the south of Europe, the twilight is surrounded by glories of which we know nothing: golden hues on the water, on the woods, on the mountain-tops, a sky of the deepest blue, save where the last rays of the setting sun have tinged it with yellow; the air feels soft and balmy, and a mellow light is diffused over the whole landscape. What gives an additional charm to the scene, is the pealing of the vesper bell from the various churches and convents about half an hour after the sun has set. Upon hearing this, every one in Roman Catholic countries, no matter in what way he may be engaged, uncovers his head and repeats the Ave Maria, or salutation of the angel to Mary, upon her conception, followed by entreaty to pray for the worshipper now and at the hour of his death. The hour of twilight seems in all countries, and at all times to have inspired emotions of sadness, or have carried back the mind to past scenes and lost friends. The effect produced by the sound of bells at this hour is well described by Moore:—

> "Those evening bells—those evening bells,
> How many a tale their music tells
> Of youth and home, and that lov'd clime
> Where first I heard their soothing chime."

But this feeling, whatever may be its cause, does not by any means prevail in this country with the same intensity as in the Roman Catholic countries of the south, where the sound of the vesper bell is the signal for a solemn act of religious worship. Let our opinions be what they may as to its worth, it must inspire some feeling of solemnity to see all the labour ceasing, all noises hushed, the plough stopped, the spade laid down, the oars raised from the water, and a whole nation engaged in prayer at the same moment every day. Our engraving, from a painting, is a good representation of one of these scenes. Two Italian peasants are rowing a monk along the lake, when the bell tolls the hour for vespers from the adjacent convent, and they immediately suspend their progress, and repeat the formula.

THE AVE MARIA.

The curfew, which by order of the Conqueror was tolled every evening as a signal for the inhabitants to extinguish their fires, we may suppose to have produced a somewhat similar effect. It is said, also, that during the carnival at Rome, when the vesper bell tolls, the rioting and merriment instantly ceases, and all fall down in adoration. This mixture of religion and gaiety is quite characteristic of the people of Italy. Light-hearted and enthusiastic, they think only of the passing hour.

"On his deathbed he lay chanting songs, and the verses and the music were both the offspring of the moment. He lamented that he could no longer commit these 'inspirations,' as he called them, to paper. 'Kate,' said he, 'I am a changing man; I used to rise and write down my thoughts, whether it rained, snowed, or shone; and you arose too and sat beside me—this can be no longer.'"

William Blake died in a garret in Fountain-court, Strand, August 12, 1828, being then seventy-one years of age.

The lines of dedication, to which we referred above, are as follow:—

TO THE QUEEN.

The Door of Death is made of Gold,
That mortal eyes cannot behold;
But when mortal eyes are closed,
And cold and pale the limbs reposed,
The Soul awakes, and wondering sees
In her mild hand the golden keys:
The Grave is Heaven's golden gate,
The rich and poor around it wait.
Oh, Shepherdess of ENGLAND'S fold,
Behold this gate of pearl and gold!

To dedicate to England's QUEEN,
The vision that my soul has seen,
And by Her kind permission bring
What I have borne on solemn wing
From the vast regions of the grave,—
Before her throne my wings I wave,
Bowing before my Sovereign's feet,—
"The GRAVE produced these blossoms sweet,
In mild repose from earthly strife,
The blossoms of ETERNAL LIFE!"

THE FLOATING GARDENS OF CASHMERE.

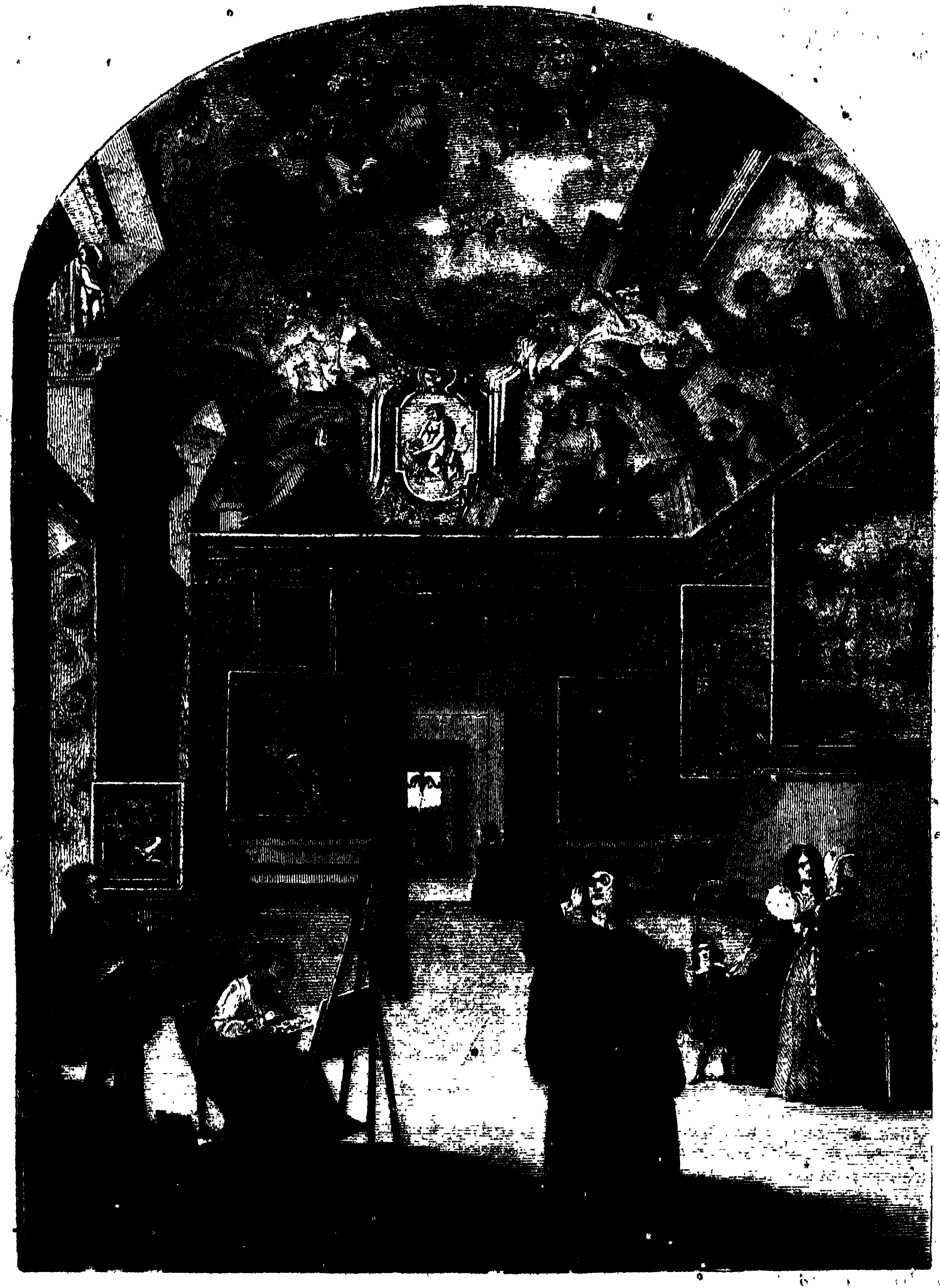
EVERY person who has travelled by book or map, or who has studied the nativity of shawls, must have heard of Cashmere—the beautiful valley around which tower "the hills of goats," and in which the flowers and fruits, the trees and other plants, with lakes and flashing rivers, revive thoughts of beautiful Eden, and which also claims to itself the name of the "Indian Paradise." In this valley the roar of the tiger is never heard, neither the howl of the jackal; the mountain goat, with its silken wool, browses unmolested in the little grassy glens, and the cattle low on the plains without fear of beasts of prey. One hundred thousand beautiful villages stand on the bosom of this magnificent natural amphitheatre, and these are peopled by men and women who are ingenious, and are said to resemble Europeans more than any other Asiatic nation.

The capital of the province of Cashmere is also called by the same name. This city is situated in the midst of numerous lakes, which are connected with each other, and with the river Vedusta, by numerous little canals—which canals, again, are only divided from each other by narrow stripes and insular pieces of ground. These lakes are not allowed to lie in passive beauty for poets only to sing about, and for the sun to exhale; upon their surface are *floating gardens*, and in these gardens melons and cucumbers thrive like mushrooms in a hundred years' old pasture-field. Cashmere is frequently inundated during the rainy season; and this frequency of inundation was considerably increasing, in consequence of the lakes becoming more shallow and superficially extensive. The spread of the water, by diminishing the arable land, set the wits of agriculturists to work, and necessity, that mother of invention, developed a plan of floating gardens. Numerous aquatic plants spring from the bottoms of the lakes, and cover their surface with a mantle of green; the boats traversing the lakes keep on tracks, and thus the yearly growth of sedges and other plants is allowed to come up and mingle with the old growths undisturbed. The gardener then cuts the plants about two feet below the lake's surface, and thus completely separating them from their roots in the bottom of the lake, he erects on them his melon floats. When the plants are separated from their roots, they are closely pressed together. The heads of the sedges and reeds are next cut off and laid on the top of the floating beds; and above this, again, is laid a thick coat of mud, which gradually sinks into the mass of matted stalks. These floating beds, perhaps two yards in breadth, are retained in their positions by willow-stakes, which, being thrust through the floating beds into the mud of the lake, admit of the gardens rising and falling according to the ebb or fulness of the waters. The gardeners then go out to the lake in boats, and thrusting long poles in among the reeds at the bottom, they twist them round several times, and when the plants become sufficiently attached, they drag them from the lake and attach them to the melon-beds. These reeds are then formed into cones about two feet in diameter at the base, and, rising to about the same height, they terminate at the top in a hollow, which is filled with fresh soft mud, and sometimes wood-ashes. These cones run in double rows down each side of the float, and are distant from each other about four feet. Previous to this preparation of the beds, the farmer has raised cucumber and melon plants under mats; and when they have struck four leaves, he places three in each cone, and then his labour, except in gathering the fruits, is completed.

The general depth of the floating gardens is about two feet, and in breadth they average from six to seven feet. The season for cultivating these terraquatic gardens begins in June, and ends about the middle of September. The plants thrive most luxuriously, few ever dying, and the fruits are most abundant; for eight days, which may be termed the extent of the melon harvest, perhaps thirty fruit from each plant, or from ninety to a hundred in all, may be seen clinging round a cone. The melon seeds are obtained from Baltistan, and the first year yield fruits of from four to ten pounds' weight. If the seed of the fruit grown at Cashmere is sown, the quality of the melon is finer, but the fruit seldom exceeds three pounds each in weight. The melon is a most healthful article of food, and it is remarked of those in Cashmere who do not indulge in it to excess, that they become fat during the fruit season, and horses exhibit the very same appearance. There are about fifty acres of these fruits cultivated in Cashmere; and early in the season full-sized cucumbers sell at about three for a coin valued at about a halfpenny; but as the weather becomes hotter, and ripens them very quickly, even twenty may be obtained for this sum. It is calculated that every cone yields a money return of about eighteen pence; the labour, seed, and import amount to about sixpence a cone, so that these floating beds are not unprofitable objects of culture.

THE BORGHESE PALACE AT ROME.

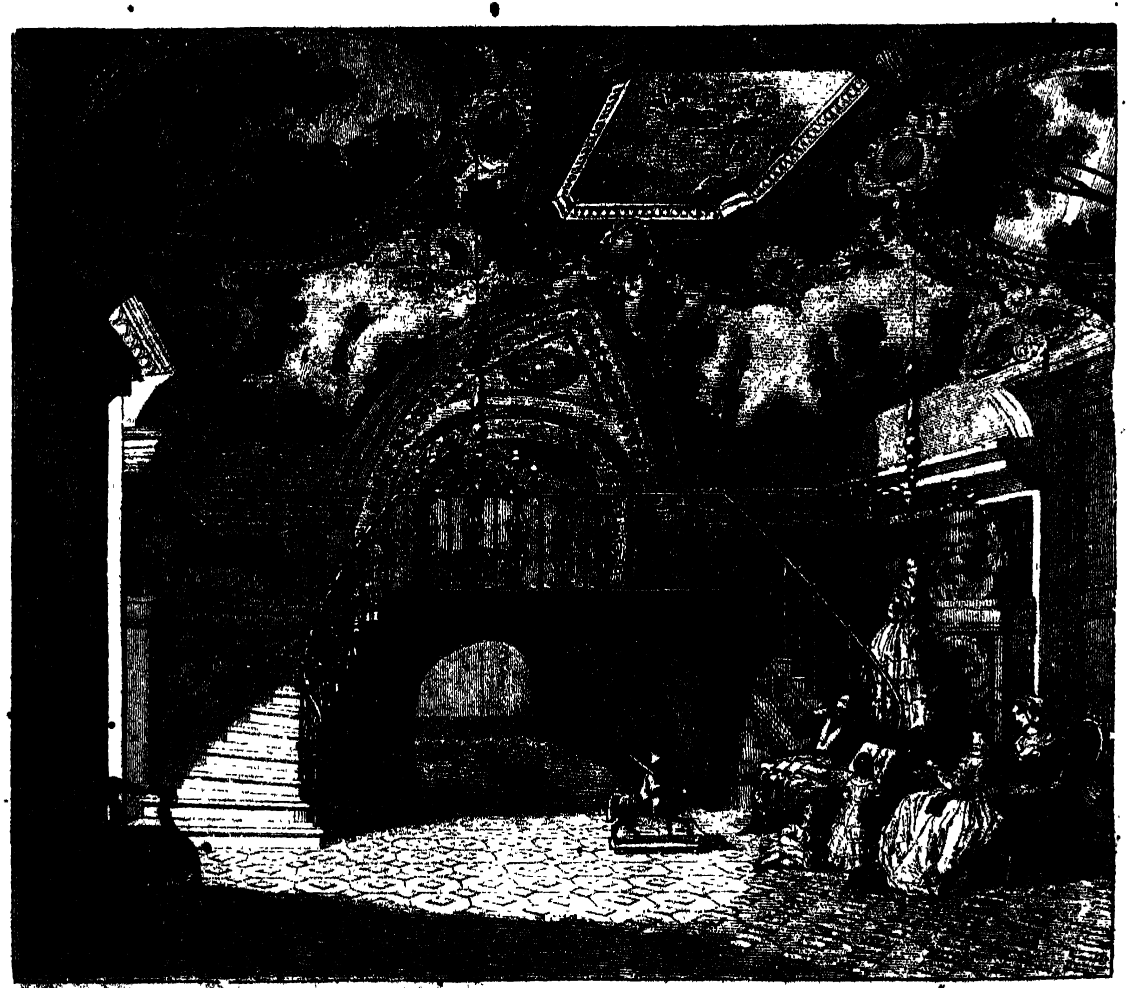
THE Borghese palace, which must not be supposed to have any connexion with a town of that name, stands on the site of the ancient Campus Martius, near Ripetta, between the Corso and the Tiber, almost in the middle of a triangle formed by the Piazza del Popolo, Colonna, and Navona. We pass in front of the façade when proceeding down the street which leads from the Spanish square to the bridge of St. Angelo. The foundation of the building was laid in 1590, by Cardinal Peter Deza. He was born at Seville in 1520, and had filled the offices of inquisitor, civil magistrate, and captain-general of the kingdom of Grenada, all at the same time. He was raised to the cardinalate by Gregory XIII., in 1578, and then came to live at Rome, where he took part in the election of seven popes, and presided over the tribunal of the inquisition. The plan of the magnificent palace, which afterwards came to bear the name of Borghese, was the work of Martino Songhi, the elder. He was born at Milan, and was for a long time a stonecutter. He built the Tower of the Winds in the palace of Monte Cavallo, the church of the Fathers of the Oratory, that of San Girolamo degli Schiavoni, and the dome of the Capitol. He also restored the



AN APARTMENT IN THE BORGHESE GALLERY. DRAWN BY FRAPPAS AND FREEMAN.

In this drawing some of the finest Paintings placed in different parts of the Gallery are brought together:—1. Near the window, the "Sibyl," by Guerchin.—2. A Dead Christ, by Vandyke.—3. Julius II., by Raphael.—4. Over the door, "Sacred Love" and "Profane Love," by Titian.—5. Cæsar Borgia, by Raphael.—6. A Madonna, by Andrew del Sarte.—7. "The Burial of Christ."—8. "Diana Hunting," by Domenichino. The paintings on the ceiling are by Eminigildo Costantini. Many of the paintings, as the Sibyl, the Burial of Christ, and Diana Hunting, which, like almost all the others, turn upon hinges, are presented in such a manner that they can be seen by the reader.

church of Santa Maria at Transtevera, and the palace of the dukes of Altemps at Apollinara.



A ROOM IN THE BORGHESE PALACE.

The palace of Cardinal Deza was finished by Flaminio Ponzio, about the year 1610, under the pontificate of Paul V., the most illustrious member of that great family of Borghèse, originally from Sienna, a scion of which married the sister of Napoleon. The general arrangement of the building has led to its receiving the name of *Combolo di Borghese.* The court is square, and of splendid appearance. All around are arcades, supported by ninety-six columns of oriental granite, forming on the ground-floor, and on the first-floor fine porticoes ornamented with colossal statues of Julia Pia, of Sabina, and Ceres. The two staircases are worthy of notice; the smallest is spiral, with isolated columns. The two state apartments, that of winter, and that of summer, are decorated with paintings, tapestries, and statues in the costliest and finest marble. Twelve rooms on the ground-floor are open to the public, and contain one of the most splendid collections of paintings in the world. One of these is divided into two compartments, containing on one side figures by Ciro Ferri; on the other, flowers by Stanchi. In this suite also are busts of the twelve Cæsars. The room represented in our engraving is at the bottom of the palace. The paintings in fresco which adorn the ceiling are by Giovanni Francisco, a Bolognese. It is impossible to give a proper idea of the freshness and elegance of this splendid apartment. The double staircase leads to a glass gallery, from which there is a view of the Tiber.

The paintings in the Borghèse palace are contained, as we have already said, in ten or twelve saloons, any one of which taken at random, would form a collection worthy of a great city, and sufficient to form a large fortune for a private individual. Still, if a choice were allowed, we might hesitate between two or three, in which some of the greatest works of the great masters are found, and which may fairly vie with the Vatican or the Pitti gallery. In one of these is the "David" of Giorgione, the rival of Titian, and sometimes superior to him; beauty, youth, and the joy of triumph, shine resplendent in the features of the conqueror, who is brandishing in triumph the bloody head of the giant; also the portrait of "Cæsar Borgia," by Raphael. Raphael never depicted life with more power than in this painting. Borgia is dressed in black, and the figure of the odious monster seems to detach itself from the sombre black ground, and traverse like lightning the three centuries which have elapsed since his death. His features, delicate but vigorous, seem to breathe the most elevated intelligence, or rather genius, intellect, and nobility. There is a faithful copy of this splendid work at Paris, in the collection of M. Ernest Legouvé. It is interesting to compare it with another portrait of Cæsar Borgia, by Leonardo da Vinci. There was also a "Danaë" by Correggio, a fine composition exhibiting all the grace and sweetness for which the painter was distinguished; "Diana Hunting," and "the Cumæan Sibyl," by Domenichino; "the Three Graces," "Sacred and Profane Love," by Titian, and a portrait of his wife, representing "Judith." Besides these, may be seen "the Descent from the Cross," and a "Madonna," by Perugino; "Two Apostles," by Michael Angelo, the draperies of which recall the Athenian style; a "Fornarina," by Romano, a good portrait, but by no means equal to that of the same person by Raphael, which is preserved in the Florence Gallery. The difference between genius and talent, between master and pupil, is nowhere so clearly displayed; of the two beauties which Raphael has portrayed in the Fornarina, Romano has perceived only the less. There are many paintings also by Bellino, Palma the elder, Garofalo, and Pierino del Vaga; a "Suzanna," by Rubens, the only foreigner, except Vandyck, whose works are admitted amongst those of the Italian masters. Some works of Andrew del Sarto, and of the Caracci; "the Four Seasons," by Albano; a "Circe," the *chef d'œuvre* of Dossi Dossi; "the Adoration of the Wise Men," by Bassano, displaying wonderful knowledge of the principles of the chiaroscuro. "Lot and his Daughters," by Gerard; and a crowd of others, which our space will not permit us even to name. It is enough to say that they form a collection unrivalled in value and extent. It is positively bewildering to traverse those long and gorgeous galleries, surrounded on every side by so many of the most glorious achievements of the grand old masters, displaying all the differences of their genius, style, and colouring,—a perfect *mélange* of beauty.

A VISIT TO MESSRS. SMITH AND BABER'S FLOOR-CLOTH MANUFACTORY.

Many a visitor to the Crystal Palace will have noticed, as he made his way thither on foot, or on omnibus roof, a tall, square, tower-like building, which is visible from between the trees for a great distance, and which stands high above all the surrounding houses. As he neared the south transept entrance of that wondrous edifice, which the Goths and Vandals of the nineteenth century have actually allowed to be pulled down, he would necessarily—if his thoughts were not too much occupied for his eyes to observe—take note of the elegant building to which that tower belongs; and if his time were not devoted to a much more important kind of sight-seeing—as, of course, it would be—an hour or two might have been very profitably spent in walking through the floor-cloth factory of Messrs. Smith and Baber, to which the tower aforesaid forms a very necessary appendage. But as during those six busy months of 1851—"the like of which" was never seen before in the world's history—each visitor to the metropolis was too full of the *Great* Exhibition, and the scores of *little* ones which opened their wide doors and invited him to enter, to pay much attention to the mere ordinary features of London industry,—it remains for us to show him what we can of the sights he passed so heedlessly. Thus, then, if he will take us for a guide, we will endeavour to initiate him into the mysteries of that great tower; and, as upon other occasions, lead him step by step through the processes of the factory which we have chosen for our present visit.

We are standing before the rather elegant rotunda which forms the entrance hall to Messrs. Smith and Baber's premises. Let us look around. The immediate spot is known as South-place, Knightsbridge. Opposite to us are the unsightly walls of the Knightsbridge barracks, while a little further west we have the aristocratic residences about which we have heard so much in connexion with the removal of the Crystal Palace. Knightsbridge is a hamlet belonging to the parishes of Kensington, Chelsea, and St. Margaret's, Westminster. It was formerly called Knightbrigg, or Neytebridge, and probably derived its name from the manor of Neyte or Neate, as Hyde-park procured its cognomen from the manor of Hyde, both of which belonged to the crown. In the thirty-fifth year of Edward III., it was ordered, according to Strype, that "all bulls, hogs, oxen, and other gross creatures slain for the sustentation of the city, should be led as far as the town of Stratford on the one part of London, and the town of Knightsbrigg on the other, and there be slain;" an order which plainly proves that our ancestors were wiser in their generation, in at least one respect, than we in ours, because they would allow no slaughter-houses to pollute the air of their dwellings. A vivid glimpse, however, of the state of society in the "good old times," is afforded us by a paragraph from the work of Norden, the surveyor and court historian, as quoted in Ellis's Introduction. Speaking, in 1593, of the bridges in Middlesex, he mentions that of "Kingesbridge, commonly called Stonebridge, near Hyde-parke-corner, wher I wish noe true man to walke too late without good garde, unles he can make his partie good, as did Sir H. Knyvet, knight, who valiantle defended himselfe, ther being assalted, and slew the master theefe with his own handes." We live in less doubtful times, happily, and may pass by the high-road from London to Oxford without fear of meeting any more dangerous "knight of the road," than a vagrant haymaker or a strolling tourist. Knightsbridge, though so "highly genteel" a neighbourhood in our day, was formerly famous in a bad sense of the term. During the last and previous centuries it possessed several notorious taverns, more than one of which is noticed by the older dramatists. Otway, in the "Soldier's Fortune," speaks of the "Swan at Knightsbridge" as a "confounded house;" and in the memoirs of Sheffield, duke of Buckingham, we read of his "skulking with a friend in an old inn" at Knightsbridge, previous to a hostile meeting between him and the celebrated earl of Rochester, "like a couple of highwaymen." The "Swan" is still in existence; it is situated a little westward of Sloane-street on the same side of the way. Tom Brown, the wit; who died in Aldersgate-street in 1704, and was buried in the cloisters of Westminster Abbey, mentions the Swan; and in the "Tatler," No. 259, as well as more than once in the "Diary" of the immortal Pepys, two other taverns of bad memory, the "World's End," and the "Old Fox" are made the subject of remark.—"31st May, 1669—Thence to the 'World's End,' a drinking house by the park; and there merry, and so home late." Though the "Old Fox," under the name of "The Fox," still exists, near Albert-gate, our men of fashion no longer make merry within its walls. In 1744, William Lane and Samuel Trotman were executed at the Tyburn-tree,—the "deadly never-green" which stood on the site of No. 49 Connaught-square, on the other side of the park—for "robbing the Knightsbridge stage-coach!" Near the Prince of Wales's-gate stood the famous "halfway house," which was pulled down in 1846, at a cost of £3050; a little way past the entrance to Kensington-gardens are the oldest nursery-grounds in London, now belonging to Messrs. Gray, Adam, and Hogg; at No. 14, Queen's-row, Knightsbridge, died the celebrated actor and author, Murphy; and in a house in Pitt's-buildings, Kensington, not a mile from where we stand, the great sir Isaac Newton breathed his last.

But we must stop, though we have by no means exhausted our knowledge of the neighbourhood; and having stayed so long before the door of the factory, we will e'en take courage and step over the threshold. Once inside the circular show-room—which forms a kind of entrance-hall to the premises, and hanging on the walls of which are various patterns of floor-cloth, and ranged on either side of which are other similar patterns in rolls as large round as the mainmast of a frigate, and at the south end of which are the counting-houses and private offices of the firm—we introduce ourselves to one of the partners—a gentlemanly young man, who at once accedes to our request—and proceed to make the circuit of the factory. It must be understood that the editorial *we*, in this case has a rather wider signification than usual, and includes the artist and his assistant, and the reader's very humble servant, the writer.

Passing through a doorway at the extremity of the rotunda, we come into the largest room in the factory. It is called

THE DRYING ROOM.

In this apartment, which is about seventy feet in width, by a hundred and thirty in length, are exhibited numerous finished floor-cloths hanging from the roof to dry. Immediately facing the visitor is the splendid specimen of workmanship which was shown by this firm at the Great Exhibition. It is indeed a magnificent evidence of the skill and judgment which are often called into operation in the production of our ordinary domestic appliances; and it may be considered quite a triumph in the way of floor-cloth-printing, both as to the intricacy of pattern and brilliancy of colour. We pass from the contemplation of this great piece of mosaic-work, however, to gaze upon the objects around us. Along the walls, and from the roof high over our heads, and occupying the entire right side of the room, are depending finished floor-cloths of all kinds of patterns, and in all states of dryness;—here a piece which has but just left the printing room above, and is coming down slowly, foot by foot, to meet its fellows in the floor below, by means of ropes and wooden rollers; there a large-patterned, gaily-painted piece like a Turkey carpet, which having hung its appointed four or six months, is being hauled down to the ground and rolled up for exportation; again, a piece in black and white diamonds, like the marble flooring of an Italian mansion; and all along, from end to end of the great room, floor-cloths in every state of finish and of every variety of dimensions—from the narrow stair-cloth to the covering for a club-house hall. It is a strange sight, like no place that we have seen before. Stop, like some place. To be sure;—it is not Smith and Baber's Drying Room, but it is "behind the scenes" at the Great National Theatre in Vinegar-yard. Of course it is, and those men unrolling a huge piece of floor-cloth on the ground are the assistants of Messrs. Grieve and Telbin, preparing the "flat" for the grand *finale* in the "Corsican Uncles;" and those two young fellows unrolling a wide bale of canvas must be stage carpenters, and those half-dozen men in shirt sleeves, who are busy with the unrolled scene upon the ground, must be supernumeraries; and those two carrying the ladder must be the porters; and that very "seedy" looking individual in black must be the leader of the "young gentlemen;" and that other one must be the ballet-master examining the state of the "traps;" and that great oblong deal box can be nothing else than a stage storm, all ready to pour over the devoted city. The very place; scenes, ropes, paint-pots, gas-lamps at the sides, sky-borders, wings, glimmering patches of light from the roof, musty, damp, white-leady kind of smell, and all. Everything but the noise and the dust.

No; it cannot be "behind the scenes," after all, for we see no dirt or pots of porter on the floor. A word from our conductor breaks the spell, and we are again at Knightsbridge, all eye and ear for what is going forward.

Floor-cloth—in French, *Toile cirée pour le plancher*; and in German, *der Fuszdecke*—of course it is, and nothing else. Our thoughts wander back a moment to the time when clean rushes strewed the palace floors of Cardinal Wolsey, and tapestried hangings concealed the bare unplastered walls of kings' houses. We think how our ancestors made shift with at best a coarse woven fabric for their ordinary living rooms, and boasted—the richest of them—a small Turkey carpet in the centre of their best apartments; when gradually a rough home-made carpet covered the newly-introduced wooden floors; when highly-finished and well-polished joiners' work took the place of these; till at last the carpet came to be a necessary even in the houses of the "common people." The consumption of carpets in Great Britain, says a clever writer, was hardly deserving of notice as a branch of manufacture till about the middle of the last century—so slowly do the elegances of life begin to be appreciated. And although now so essential to our warmth and comfort, a few generations since carpets were only partially used even in the mansions of the rich. A few manufactories, of which that at Wilton was the most important, existed in different parts of the kingdom; and at Kidderminster, which is now the principal seat of the trade, and where at least four thousand persons are employed in different branches, the carpet manufacture did not commence before the early part of the eighteenth century. We doubt whether at the commencement of the nineteenth century one-fourth of the present number of carpets was manufactured. Oh, who would sigh for the "good old times?"

We have seen the floor-cloth in its finished state; it is necessary now that we should endeavour to understand the various steps whereby that perfection is attained. As our readers may be probably aware, the body or foundation of the floor or oil cloth is composed of coarse canvas, thickly coated over with paint on *both* sides, on the *front* or upper side of which a pattern is impressed by means similar to those employed by the paper stainer. This canvas, which is made in widths of from eighteen to even thirty feet, is produced chiefly in Scotland, by manufacturers, whose chief business is confined to weaving cloths of these extraordinary dimensions. From Dundee, however,—a town in which the production of coarse sail-cloths, sackings, wide sheetings, and other articles in flax and hemp, form the staple manufacture,—comes the principal supply. All modern floor-cloths are made in one piece without a seam, and the looms in which such wide canvases are made have therefore to be constructed expressly for them. "As the weft or width of the cloth extends to six or eight yards, of course the shuttle has to be driven this distance at each successive traverse of the weft thread. At first sight, these cloths have more the appearance of hemp than of flax, but hemp is used only to a limited extent, because it is found not to retain the colour so well as flax; the latter is therefore the material generally employed. The canvas has a fineness of about sixteen or eighteen threads to the inch, and a degree of stoutness which may be indicated by saying that a square yard weighs about twenty-two ounces." We will suppose the canvas to have been shipped at Dundee and to have arrived at the warehouse of the London manufacturer in the form of compact bales nearly three feet square, each bale containing canvas of one particular width, and weighing about five hundred weight each. The ordinary kinds of canvas for floor-cloth are regulated somewhat in this fashion. "One kind measures a hundred yards in length by six in width, another a hundred and eight yards in length, by seven in width, and a third a hundred and thirteen yards by eight." Sometimes old Brussels carpets of good quality, which have lost their colour, have been used instead of canvas; and in some of the better kinds of floor-cloth the material for the foundation is of so fine a quality, so completely coated with paint, and brought to such a smooth surface as rather to resemble the canvas for the artist than for the mechanic. Having premised thus much—and after having glanced into various rooms set aside for the storing of canvas, colours, printing-blocks, &c.,—we will retrace our steps, and pass from the Drying into

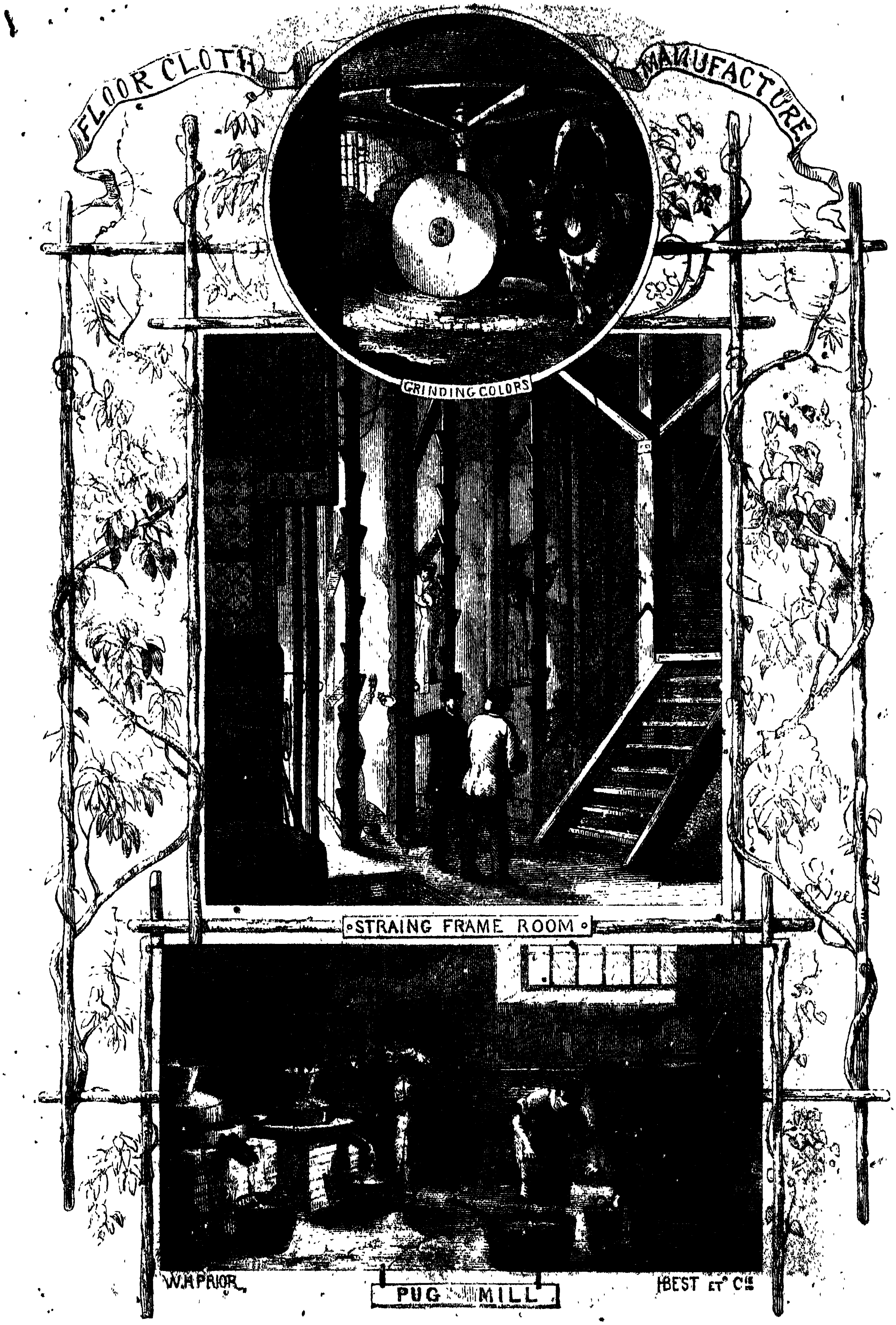
THE COLOUR ROOM.

Down a few steps, and we are there. This apartment is rather useful than ornamental. In the centre, as seen in the engraving, is an immense horizontal cog-wheel moved by horse-power. The revolution of this wheel sets in motion, by means of other cogs,—the action of which the mechanic will readily understand, though it would take long to explain,—various grinding stones set on edge for grinding the colours. In this room all the paint used in the after processes is prepared; and behind it is a large open court or yard in which are placed several great cisterns of linseed oil, capable of containing, together, upwards of fifty tons. Leaden pipes conduct the oil from the cisterns to the different vessels in the colour-room. Beyond the oil yards are a smith's and carpenter's shop for the making of the printing blocks—of which we shall afterwards have to speak—and for the repairs necessary to the different parts of the apparatus employed. Close to the colour-room is another apartment in which is a "pug mill" for the mixing of the colours previous to use. Vats, tubs, pails, iron ladles, labour-stained workmen; and a strange odour—an odour of a newly-painted house and a soap factory and a tallow-chandler's shop and a close room and an oil warehouse in the London Docks, all mixed into one,—are its principal characteristics. The principal ingredients used in the paints are the ochres, chromes, prussian blues, verditer, vermillion, and other earthy pigments; and as "dryers" or turpentine, are not used in the mixing, the floor-cloth has to remain a long time hanging—usually from four to six months—before it is fit for use. The paint used is of a much thicker and stiffer kind than that required for other purposes—so as to ensure the exquisite durability to the cloth.

We return to the Drying Room, and, ascending a few steps, come to the

STRAINING-FRAME ROOM.

Here a new scene entirely awaits us. At first we can discover nothing but a great flat yellow superficies of canvas stretched out before us; but, on further inspection, we perceive that the room—a very large and very high one—is filled with similar flats of canvas stretched on vertical frames, which extend from roof to floor and from wall to wall. And so full is the room with these frames, each with a canvas, stretched, or being stretched, upon it, that space is only left between each for a man to pass. Our engraving conveys but a faint idea of the appearance of this apartment; but let the reader conceive some couple of dozen or more


FLOOR CLOTH
MANUFACTURE
GRINDING COLORS
STRAING FRAME ROOM
W.H.PRIOR
PUG MILL
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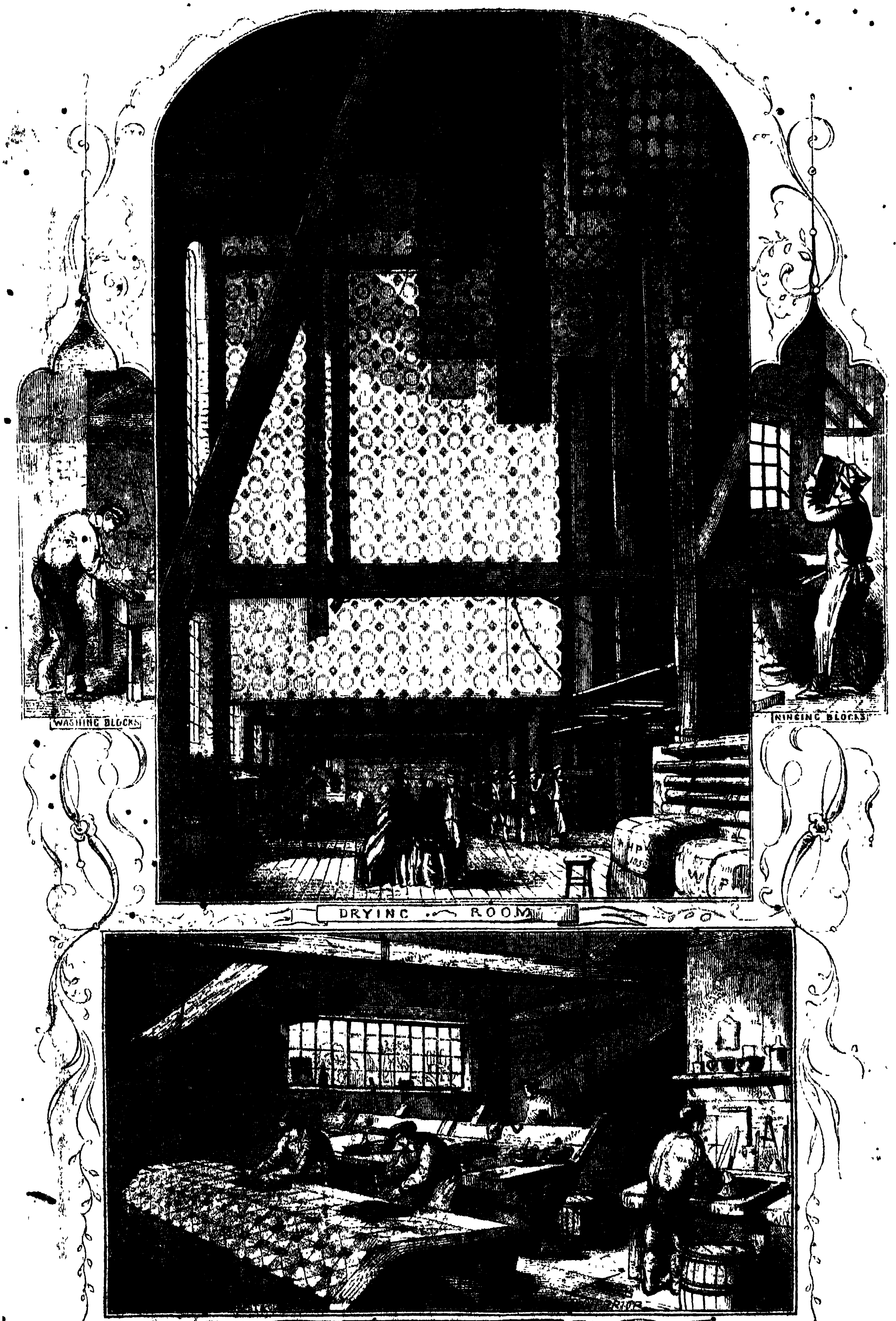

WASHING BLOCKS
NINCING BLOCKS
DRYING ROOM
PRINTING ROOM

of his lady-acquaintances' embroidery-frames, with the canvas stretched upon nearly all of them, ranged side by side with but an inch of space between each, and a slender scaffolding partly occupying that space, and the whole enclosed within four walls and a roof, and he will have realised a pretty accurate idea of the Frame Room of a floor-cloth factory.

Having formed some notion of the appearance of this room from his mind's-eye model, he has only to enlarge the idea by fancying each of those frames to be from sixty to seventy feet long, by twenty-four or thirty feet high, and he will have the place before him. Some frames, however, are occasionally made as much as ninety feet long.

We will now endeavour to explain the process of stretching the canvas on the frames. When a piece of canvas is about to be painted, it might be supposed that it was laid flat on the ground, pulled, and perhaps nailed at the edges to stretch it smooth, then painted, and, when dry, painted on the other side. A very different process is, however, adopted in practice. A party of men unroll the canvas, and lay it down pretty evenly on the floor of the Drying Room. They then take a wooden roller rather longer than the width of the canvas, and about five inches in diameter, and lay it down on end of the material. On this roller the whole of the canvas is coiled, and in that state it may be readily carried from place to place. The roller, with the canvas wound round it, is then erected on end, and hauled into the frame-loom by means of pulleys. Here an iron point or gudgeon is dropped into a hole in a moveable carriage, and the roller is moved to its place in a very simple and ingenious manner. Two or more men hold the upper end of the roller; while others, standing on the floor of the room, twenty or twenty-four feet lower than the rest, guide the carriage in which the lower end of the roller rests. The roller is thus brought to its proper position coincident with one end of the frame to which the canvas is to be attached. This frame, like all the others, is formed of stout oaken beams, two horizontal, to form the top and bottom, and two vertical, to form the ends or sides. The roller, being about the same height as the frame, and a small portion of the canvas being unrolled, it is easy to nail the edge of the canvas to one of the upright posts, thus forming the commencement of the stretching process. The carriage on which the roller rests is then wheeled onwards, the canvas unrolling as it proceeds, parallel with the frame. As it unrolls, the canvas is fastened temporarily to the top beam by means of a simple but ingenious contrivance called a "quickset"—a much more intelligible name than is often applied to working tools. The "quickset" is a kind of screw and nut, provided with a large hook at the top, and a small-pointed hook at the bottom; the large hook catches hold of a rod lying at the top of the frame, which the small lower hook catches in the canvas. There is a hook by which it is carried up tightly to the upper beam of the frame, so as to keep the canvas nearly at its proper height; while the upper hook, by being able to move along the rod, suffers the "quickset" to move to the right or left as the canvas becomes stretched. This however, is only a temporary contrivance, used while the immense area of canvas is being adjusted to the four sides of the frame; but it is one of those ingenious adaptations which we see so often employed in the manufactures, and which could only have resulted from a steady observance of the object in view.

When the low-wheeled carriage in which the roller rests, has travelled from end to end of the floor, and the canvas has become wholly unrolled, and its upper edge temporarily held up by a number of "quicksets," the roller is entirely removed, and the second or remaining upright edge of the canvas is nailed to the other upright beam of the frame. It will be readily understood that if this beam were a fixture, it would be almost impossible to stretch the canvas with a sufficient tightness. But this beam is loose, and when the edge of the canvas has been nailed to it, two screws, one at the upper and the other at the lower end are brought into operation; and, by means of which the post is drawn outwards till the canvas has been brought to a proper degree of tension. And when we come to consider that the superficies thus stretched, sometimes contains nearly ten thousand square feet of canvas, we can readily imagine the force required in this latter process. When the vertical edges are properly secured, the upper and lower edges of the canvas are made fast and the quickset removed. By means of levers, chains, and hooks, this last operation is performed; and no drum-head is tighter than the canvas thus stretched upon the frames.

From the above rather technical description—for which we are in great part indebted to the description of Mr. George Dodd, who visited this factory about ten years ago—it will be seen that the stretching of the canvas, or "framing" as it is called, is a highly important part of the process. With our already acquired knowledge, therefore, the after processes are easily understood. Between each frame of canvas an apparently slight, but really strong, framework or scaffolding of wood is erected, on which the workmen stand to paint the stretched canvas. Access to the upper tiers is gained by means of ladders. The inequalities of the cloth are then carefully rubbed down by means of pumice-stone (the lava of volcanoes), and the

PAINTING PROCESS

commences. This may be dismissed in fewer words than we have used above. If we examine a piece of floor-cloth, we shall perceive that it is painted on both sides. The material having been made smooth and level by means of the pumice-stone, a solution of size is laid on it to prevent the paint from penetrating too far into the substance of the cloth, and to make a good foundation for the after processes. The workman, either standing on the floor, or mounted on the platform at various heights, according to the part of the cloth on which he is employed, then begins the painting. From his situation it is plain that he can paint the back of one cloth and the front of the other. But the paint itself, instead of being used in the ordinary way, is laid on with a kind of trowel, about a foot long and tapering towards the end; and with it, the workman proceeds something in the manner of a plasterer. In his left hand he holds a short brush, well filled with paint from the pot beside him, and with it he gives successive dabs on the cloth; while with his right hand, he spreads the thick paint, so left in patches, evenly all over the surface. In this way he proceeds with both sides of the floor-cloth, climbing from stage to stage of the scaffold—which is so arranged, that, standing on the one, he can reach the next above him, and so on—till the entire surface is covered with paint. The trowel painting, however, is not sufficient for the front of the canvas; which previous to its being printed on, receives two coats of paint, laid on in the usual manner. But it is not till the back is perfectly dry, that the front, or upper side, is touched—a fortnight, at least, being required for the drying, according to the quality of the future floor-cloth. Thus the face of it receives a greater or less amount of labour in the preparation,—the finer descriptions requiring, besides the "trowel colour," to be painted and rubbed down with pumice-stone, and painted again and again with the brush—the "brush colour." In the "good old times," when the exciseman was present at every stage of the manufacturer's labours, it was considered necessary for him to use certain private marks and colours for the back of the floor-cloth to distinguish his particular make of goods: these peculiar symbols are still continued, though excise restrictions have long been abolished.

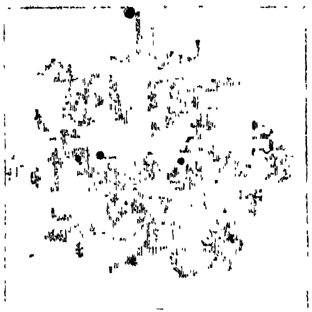
The first coat of "brush colour" which is to form the ground of the future pattern, having been given to the face of the canvas, it is allowed to remain in its vertical position till it is dry enough to bear the operation of printing—a period of about two or three months. It is then unfastened from the frame, and transferred to a roller of about the same width as the canvas, whence it is hauled up to

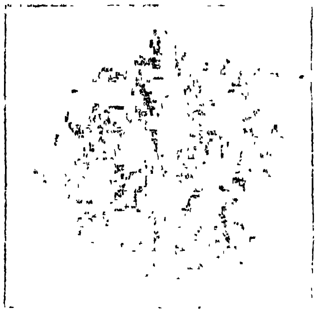
THE PRINTING ROOM.

Of course it will be understood that the successive coats of paint have increased the weight of the canvas very considerably; great care is therefore necessary in bringing it into the printing room, lest it crack or become rubbed on the surface. When the roll of painted canvas is brought hither, the ends of the roller are put in iron sockets, so that the canvas can be unrolled and placed on the table to be printed; and as each yard receives the impressions of the printing blocks, it is lowered through a slit in the floor over rollers and horizontal poles into the drying-room below, where it remains till it is perfectly seasoned and ready for sale.

The process of printing is not unlike that of paper-staining, or the colour-printing invented by Mr. Baxter, each colour having a separate wood block. There is this difference, however, beween the processes. In paper-staining the colours are printed ver, and occasionally blend with each other—in floor-cloth rinting each colour stands separately on the groundwork, one olour never mixing with another. The reason for this is, that he very thick nature of the paint employed would, if one colour were printed on another, render the surface very uneven. The ctual operation of printing is simple in the extreme. The workman takes the necessary quantity of ink on his block, from a ushion on which the ink is ready mixed, and places it lightly in ts place on the canvas. Holding the block by a leathern loop n the top with the one hand, he gives it a smart blow with a mallet which he holds in the other; and thus proceeds along the whole width till the cloth has received the impression of one olour. If the pattern consists of two or more colours, he is ollowed by another workman who, by means of "guide points," eft in the patterns, is enabled to stamp another block so exactly n its place as to produce a continuous and harmonious design.

To render our meaning somewhat plainer, we must recapitulate little. We will suppose a pattern to consist of five colours—a y no means unusual number. The background is, say a light drab. Upon each block is cut a device which corresponds with paces left in the other blocks. If the green be printed first, the ther colours follow in their order till the whole forms a finished


Light green.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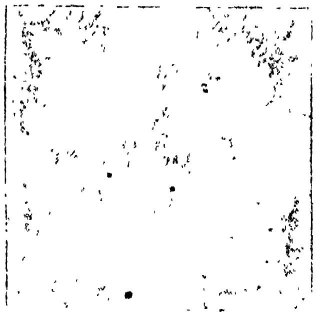
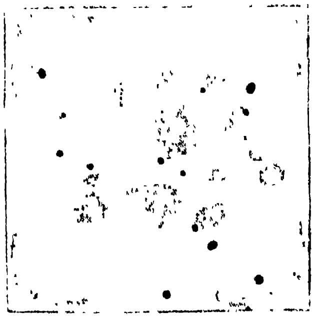
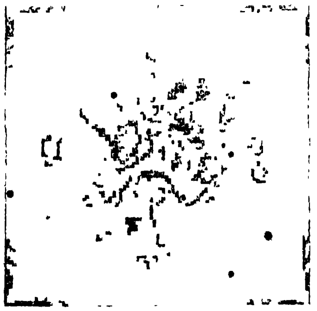
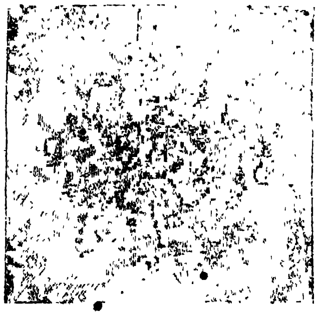

Yellow.


Red.

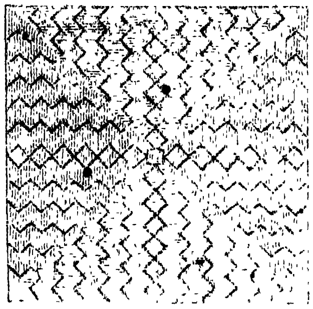

Black.


Finished pattern.

pattern as shown in the diagram—no one colour interfering with the other. The right-hand figure, it will be seen, embraces all the others, and represents, as nearly as can be in black and white, the appearance of the finished floor-cloth. In this way half a dozen workmen, each with a block of a different colour, may work on one piece of canvas.

The cutting on each block is so nicely adjusted, that although several colours appear on one pattern, no one colour covers another, so that the whole when dry is of equal height. Thus the entire pattern is made up of five separate blocks, the whole forming one elegant design. Taste and ingenuity in this, as in calico-printing, are the necessary means of success. Whatever the pattern, however, the method of transferring it to the canvas is the same. In some extremely rich carpet patterns, as many as ten or twelve blocks are necessary.

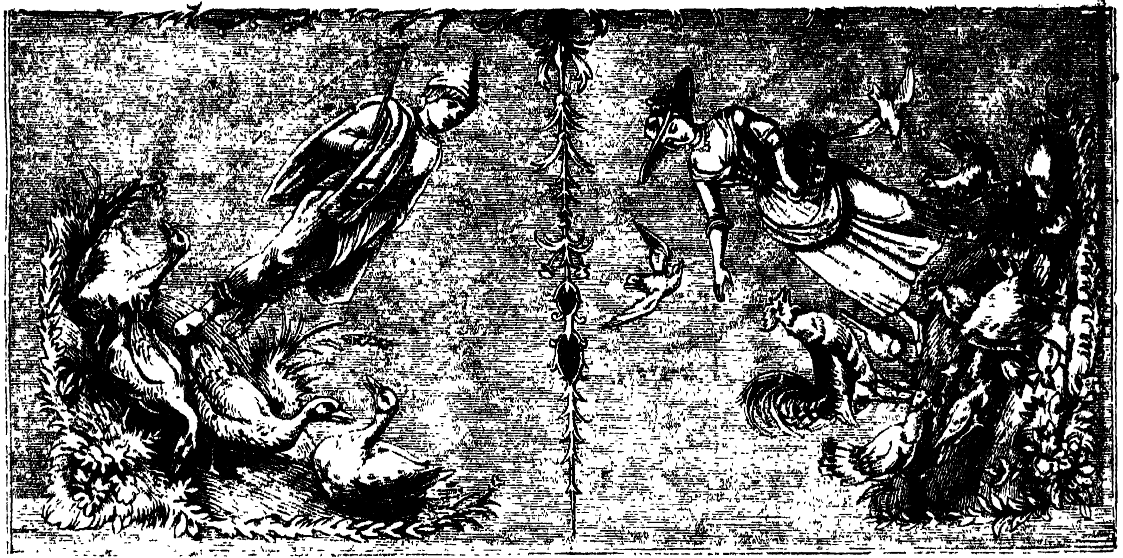
The first patterns in floor-cloth printing were produced by means of thin metal or pasteboard stencil-plates, in a similar way to that formerly applied to walls; but in 1764 it struck Mr. Nathan Smith, the founder of the firm, that similar blocks to those used in wood engraving might be advantageously applied to floor-cloth. If any of the wood engravings in the present sheet be examined, it will be found that all the white lines are produced by cutting away the wood from those parts. In this way Mr. Smith produced his first printing-block. It was a very simple affair, but it answered its purpose, and showed the practicability of the idea. Being inked and pressed closely on the prepared canvas, it was found to leave an exact counterpart of the pattern beneath. Of course the inventor was proud of his invention, and kept his plan of operations secret for many years—printing the patterns himself, and allowing none of the workmen to see how it was done. But it came out in time, and other manufacturers adopted it; the original block is still, however, in the possession of the firm. The blocks at present in use are cut in a great variety of patterns. They are all one size—about fifteen inches square—and must, necessarily, be cut with the greatest nicety; for if one part of one block touched any portion of the pattern on another, a flaw in the design would be the consequence. Of course, the manner of producing the pattern on the block will be readily understood from inspection of the small engravings. When a finished drawing of the whole design is made, the separate parts are determined on, and the parts which are not to appear are carefully cut away. The several parts are made to correspond, and the workman is enabled to lay each block on exactly the right place by means of point-holes left in the design, which are afterwards filled up with the point of a brush, and brass pins at the corners of the block, the impressions of which are incorporated with the design. The blocks themselves are formed of two thicknesses of white deal and one of pear-tree, in which last the pattern is cut. The liability of the wood to warp is met by crossing the grains of the several layers. The paint used in forming the pattern is not so thick as that used for the foundation and back, though it is considerably thicker than that used in house-painting, and is almost deficient of turpentine.

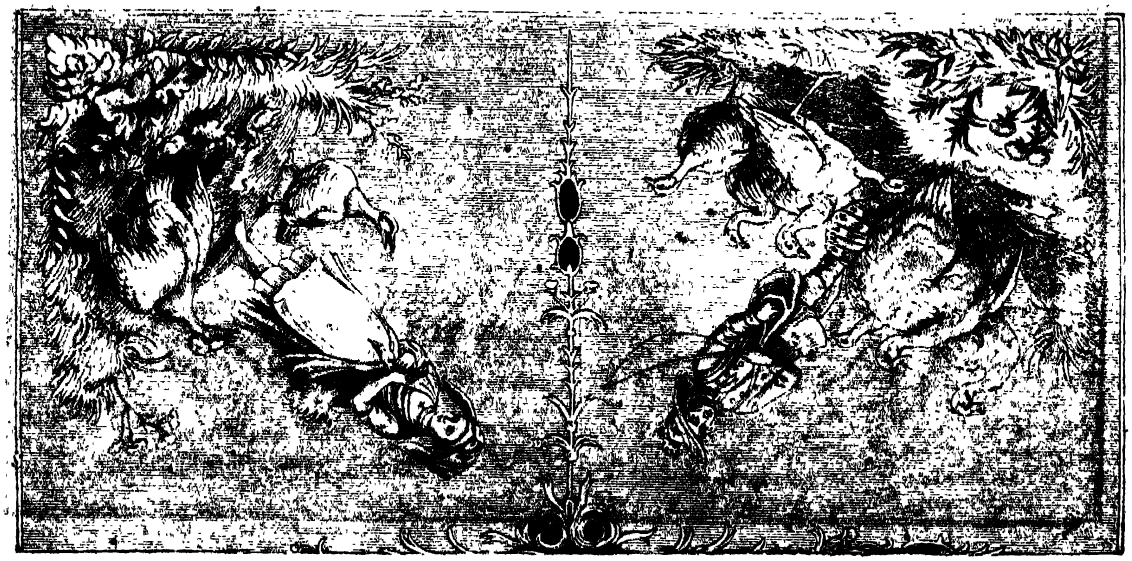

First floor-cloth pattern.

If we examine a piece of floor-cloth we shall find that it consists of a number of little square points, on each of which the print rises to a point. This appearance is produced by leaving a slight cavity in the surface of each point or "tooth" in the printing-block; and the purpose of this plan is to enable the printer to leave a larger surface of ink on the canvas—as it is obvious that if the surface of the block were perfectly smooth and level the ink could not be so equally distributed in consequence of the affinity between the wood and the ink. In the printing of floor-cloth for stairs, passages, &c., the canvas is cut into strips after it has left the "frame," and afterwards printed with such smaller blocks as may be necessary for the borders, &c.

Having now visited every room in the factory, not even excepting the square tower,—which is used to hang pieces of floor-cloth of extreme length in, and from the windows of which a fine view of the surrounding country is obtainable, and from which we can catch a glimpse of the barbarous operation of pulling down the Crystal Palace, we descend to the Drying Room; and having thanked our courteous conductor, take our leave; more and more impressed with the idea that the free exhibitions of London are the most interesting after all.

DAMASK TABLE-CLOTHS.





The four accompanying engravings are taken from some remarkably beautiful damask table-cloths manufactured by Prœles, of Dresden. They are truly German in character, representing scenes from the chase and the poultry-yard. The figures are very natural, and the animals full of life and action; they exhibit that peculiar trait of German art which draws upon everyday life for its originals with the most perfect success.

The art of damaskeening linen and other stuffs was first discovered in Damascus, whence it takes its name, and afterwards spread through Greece and Italy over the whole of Europe. For a long time Saxony, Silicia, Bavaria, and Flanders, almost monopolised the trade, but since the French revolution Ireland has made such progress, that she now stands at the head of all linen manufacturing countries. In Silicia there are no large factories, but the weaving is carried on by the peasants themselves, and, as is almost invariably the case where similar trades have been divided among many producers, they are very poor, and subject to great hardships.

In the neighbourhood of Herrnhuth every valley is dotted with detached houses where looms are at work; each cottage has its little bleaching-ground, and the hill-sides are covered with linen and yarn in various stages of progress.

Several years ago, the demand for the Silician linens almost ceased,—indeed, it had been gradually ceasing for some time,—and consequently the weavers were reduced to the most desperate misery and want. Their situation becoming known, a deal of interest was excited about them over Germany, and sums of money were liberally raised for their relief. Freiligrath, the greatest of living German poets, wrote one of his most beautiful poems on the subject; a weaver-boy is supposed to have left his home with a bundle of linen, in the desperate hope of meeting Rübezahl, the protecting spirit of the Riesen-Gebirge, many wild legends are told of this Rübezahl by the superstitious inhabitants, who still in many places firmly believe in his existence. We make the following extract from Freiligrath's beautiful poem :—

Green grow the budding blackberry hedges
What joy! a violet meets my quest ;
The blackbird seeks the last year's sedges,
The merry chaffinch builds her nest

The snow has from each vale receded,
It only clothes the mountain's brow.
I from my home have stol'n unheeded ;
This is the place ; I'll venture now,
Rübezahl

Hears he my call ? I'll boldly face him ;
He is not bad. Upon this stone
My pack of linen I will place him ;
It is a right good heavy one,

And fine : yes I'll uphold it ever,
I' th' dale no better's wove at all,
He shows himself to mortal never ;
So courage, heart ! once more I call,
Rubezahl

* * * *

Thus spoke the little weaver lonely,
Thus spoke and cried he, weak and pale.
In vain : the casual raven only
Flew o'er the old gnome-haunted dale.
Thus stood he while the hours passed slowly,
Till the night shade dimm'd the glen,
And with white quivering lips said lowly,
Amid his tears yet once again, Rübezahl !

ENGLISH COMMERCE IN THE THIRTEENTH AND FOURTEENTH CENTURIES.

NATIONS, like individuals, at an early period of their life, often make many fruitless efforts before they discover their true vocation. It might seem impossible for a people to mistake the direction given to their energies by the natural capabilities of their country; and there is, indeed, little doubt but nature will in the end vindicate its rights. The insular position of England, its many excellent harbours, its treasures of mineral wealth, its perseveringly industrious population, seemed to point out manufactures and trade as its natural occupations. Yet we find that it began its commercial career as a producer and exporter of *raw materials*; and that the sole object of early commercial legislation was to render it, as far as possible, altogether independent of foreign productions and manufactures.

The period we have selected for review comprises five reigns, those of Henry III., Edward I., Edward II., Edward III., and Richard II., and very nearly coincides with the thirteenth and fourteenth centuries, A.D. 1216—1399. Articles exported from England were at this time few. Large quantities of wool, produced in her fertile pastures, were sent to Flanders, and thence returned in the shape of fine cloth. Cloths of a coarser quality were manufactured at home. Sheepskins and leather were exported to different parts of Europe. The first mention of our island which we meet with in any ancient writer, is comprised in the fact that the Phœnicians came to Cornwall for tin; and both that metal and lead were at this time sent abroad from the west-country mines. In good years England exported corn; after a bad harvest, small as was her then population, she was obliged to rely in part on her neighbours. Occasionally, too, "British wine," the veritable juice of the grape, was exported, though we cannot imagine it could have been acceptable to the dwellers among the more generous vines of France and Spain.

We owe our chief knowledge on these points to the fact, that, in the period under consideration, Customs' duties were paid on goods which quitted as well as on those which entered the kingdom. Then, as now, Parliament granted supplies in the shape of a fixed tax on certain commodities, though exportations as well as importations were subject to it. The question is now being agitated whether customs, even if collected under regulations as little vexatious to the merchant as possible, are not a hindrance to trade, and an inconvenient way of raising money for the expenses of government. Yet in the thirteenth century the Legislature, having regard to ease of collecting, imposed such restrictions upon foreign trade, that it is wonderful that English commerce was not stifled in its birth. The goods upon which duties were anciently paid—wool, sheepskins, leather, and afterwards tin—were called the *staple* goods of the kingdom. And the word staple properly meant a place where alone such goods might be bought and sold, and the duties accruing to the king collected. For instance, in 1313 Edward II. enacted that all staple goods exported to Holland should be carried to Antwerp, and there disposed of. This was a regulation objectionable enough in itself, yet made, by alteration, ten times more so. No sooner had merchants accustomed themselves to the exigencies of the Antwerp market—probably established agencies there—than all their trade was disturbed by the removal of the staple in 1326 altogether from the continent to certain places in England, the names of which have not been preserved. In 1334 these places were all altered. In 1341 the staple was again transferred beyond sea to Bruges, in Flanders. In 1348 it was taken to Calais, then just captured by the English. In 1353 the staple was ordered to be held *for ever* at the following places, which we may thence conclude were the chief commercial towns of the kingdom:—Newcastle, York, Lincoln, Norwich, Westminster, Canterbury, Chichester, Exeter, and Bristol; Carmarthen, for Wales; Dublin, Waterford, Cork, and Drogheda, for Ireland. This eternal act was repealed ten years afterwards, and the staple removed in 1363 to Calais; thence in 1369 to places in England; and back again in 1376 to Calais. We need not pursue further the detail of these changes; enough has been said to demonstrate their mischievous effects upon the national industry. A grazier residing on the East coast, directly opposite the coast of Flanders, is not to export his wool directly to the seat of manufacture, by means of neighbouring ports, Hull, Lynn, or Yarmouth, but is obliged to send it far south to Calais, there to be measured, assessed to duty, and sent back again. It needs no deep knowledge of political economy to see that the price of the cloth, to the ultimate purchaser, will be increased not only by the duty, but by the cost of this extra carriage.

We have already stated that most of the fine cloth worn in England was manufactured in Flanders; the trade between the neighbouring countries was thus of the simplest and most profitable nature. One supplied the raw material, the other the manufacturing skill. Yet the attempt was more than once made to destroy this natural balance. The barons, who had usurped under Henry III. the chief power of the kingdom, in order to annoy the king, who greatly favoured his wife's foreign connexions, prohibited all exportation of wool, and all importation of cloth. In 1271 the same prohibition was renewed, yet in both countries the inconvenience was so severely felt, the manufacturers of England being far too young to live under such rough nursing, that the prohibitions were never practically enforced for more than a few months.

Another device for shackling internal commerce was suggested by royal selfishness. In 1245, Henry III. held a fair at Westminster for fifteen days, ordering all the merchants of London to close their warehouses and bring their goods thither, and suspending for the same period all other fairs throughout the kingdom. In 1249, the same arbitrary injunction was repeated. The king's object in both cases was to make money by the tolls he charged for the ground on which the temporary shops were erected. The traders present complained bitterly of the restriction, for on both occasions the weather was deplorably bad, and their personal discomfort great; but the royal end was answered, and that was enough.

This effort of kingly caprice may be regarded as an episode in the steady legislative interference with the foreign trade of the country. This was, for the most part, carried on by foreigners, who were either permanently settled in London, or visited that city periodically. These men were generally citizens of the great Flemish or Lombard commercial communities which play so important a part in the early history of modern Europe. The English people and legislature were absurdly jealous of their superior success in trade; and, forgetting the rare products of distant countries which they left behind, ignorantly imagined that the wealth, acquired by this commerce, was a robbery of themselves. These feelings were amplified in act. Edward I., in 1275, commanded that all foreigners should sell their wares within forty days of their arrival in England. The exaction of larger profits must have been the natural and inevitable result of such restrictive enactments—as they imposed increased risks of trade. No foreign merchant was allowed to trade at all, without a special royal licence, till, in 1303, Edward I. issued a general charter of toleration. Even then, all goods, save spices and mercery, were to be sold wholesale; no wine was to be exported; and every merchant was to be made liable for the debts and crimes of every other.

This fundamental relief was followed by fresh and grievous restrictions in 1307. In that year an ordinance was published, prohibiting the export, on any pretence whatever, of coined money or bullion. Could this ordinance have been practically enforced, its effect would have been to reduce the foreign commerce of our country to the level of that barter by which the savage of the South Sea, exchanges his yams, for axes and nails. And again the price of every commodity would be raised, by the increased trouble and risk imposed upon its sale. In 1308—the very next year—the merchants of France, were relieved from this oppressive enactment; and afterwards, those of other countries. Yet the law remained upon the statute-book; and many an effort was made to ensure its enforcement. Searchers were appointed at the ports—and rewarded by a fourth part of the confiscated property. Edward III., in 1343, raised the reward to one-third—for which we may conclude that smuggling prevailed very extensively. At last the legislature gave way. Richard II., in 1390, and Henry IV., in 1400, issued permission to foreign merchants to carry away half the price of their goods in money; compelling them, however, to give sureties to the custom-house, on entering the kingdom, that they would expend the other half in the purchase of British productions for exportation. It is curious enough to remark, as showing the prevailing ignorance on commercial matters, that during the whole period in which the exportation of money was forbidden, that of bills of exchange was expressly permitted.

Another regulation, which it is difficult to trace to any worthier motive than caprice, enacted that all foreign cloth brought to England for sale should be in pieces of a prescribed length. By an act passed in the reign of Edward III., 1328, it was ordered that all pieces of coloured cloth, not exactly 26 yards long, and 6½ quarters broad, should, after measurement by royal officers, called *aulnagers*, be forfeit to the king. In 1353, however, the force of circumstances had so far conquered the whim of Parliament, that it was ordered that all cloth deficient in length or breadth, should thereafter, not be forfeited, but only marked by the king's aulnagers, that the buyer be not deceived.

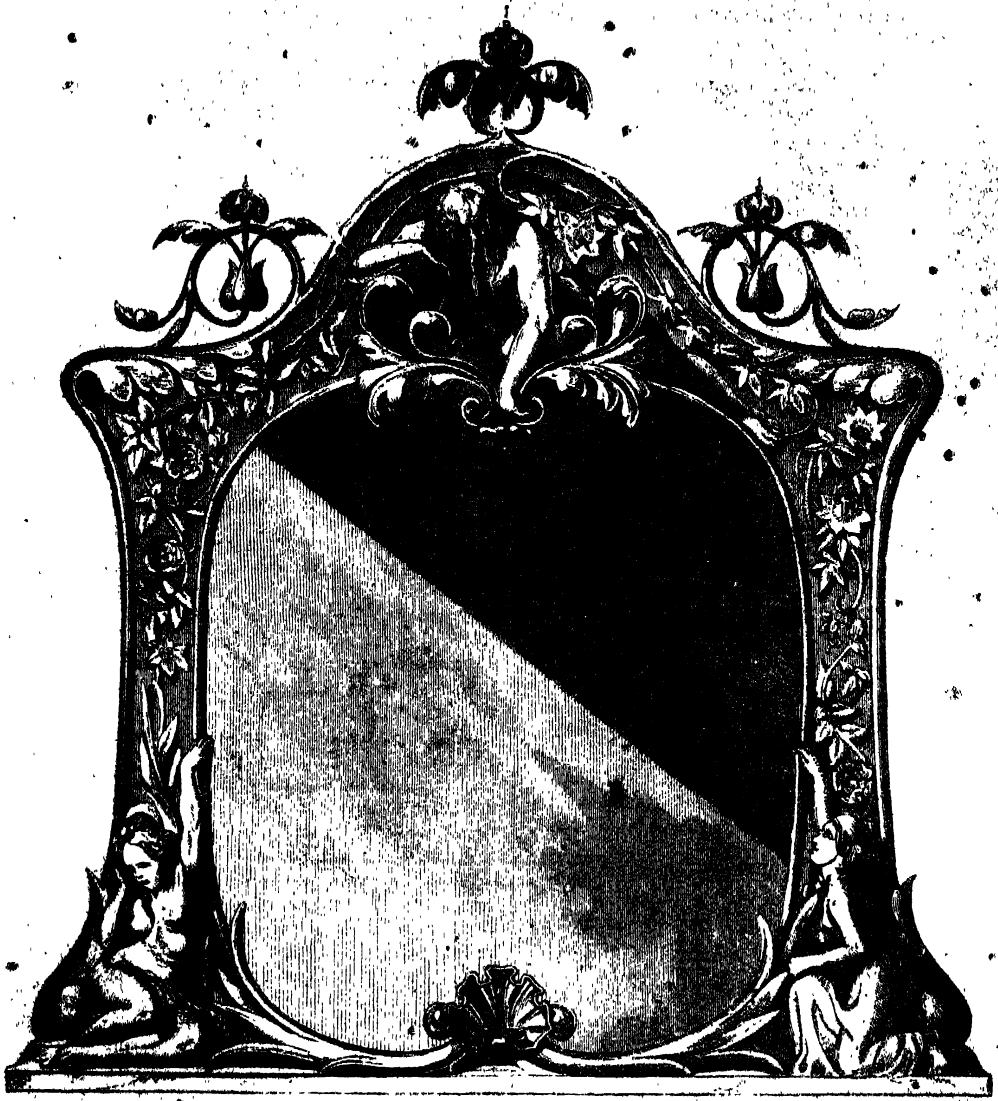
Before leaving the subject of the foreign trade of England in the thirteenth and fourteenth centuries, we may remark that the earliest commercial statistics in our progression, are contained in an Exchequer account of the exports and imports, on which duty was paid in the year 1354. The total value of the exports for that year was £212,338 5s.: the duty paid on them being £781,846 12s. 2d. Thirteen-fourteenths of the whole exports consisted of wool, the duty on which averaged about forty per cent. The total value of the imports for the same year was £38,383 16s. 10d. At the same time it must be remembered that those accounts refer only to articles upon which duties were chargeable, and that there were no doubt many other species of merchandise constantly circulating to and from the continent.

ART INDUSTRY.

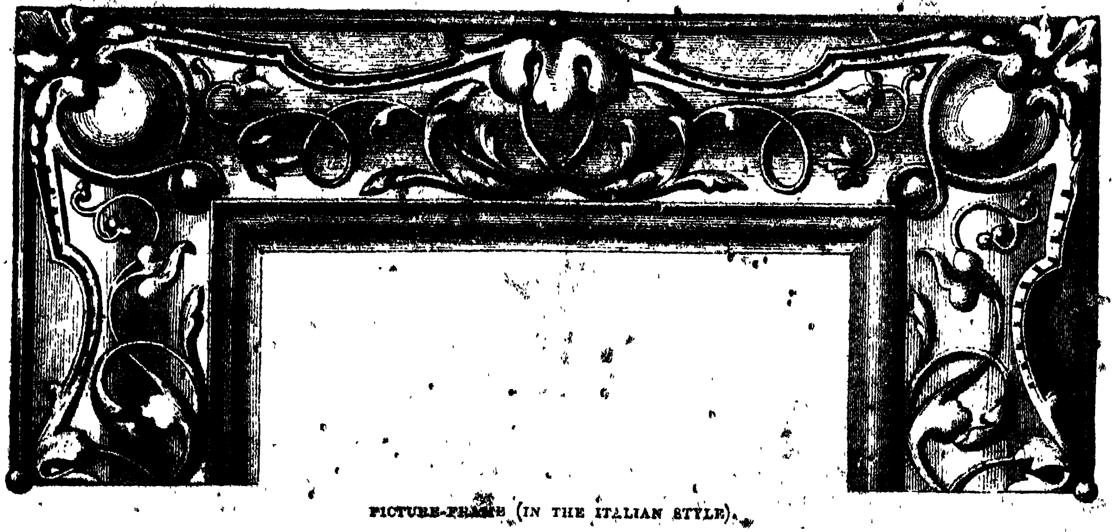
In all former stages of civilisation, whether of our own or that of foreign countries, there has ever prevailed some particular style or to te analogous to the handwriting of an individual, by which at the present time the merest tyro in art may with certainty assign the period at which any object, whatever be its branch of production, was executed, or under what climate it may have been produced. Such is not, however, the case with the present age, which evidently, in art as in other things, is one of transition. We make and execute designs in every conceivable style, and there is no taste extant—be it ever so puerile—which has not its votaries. The art of the nineteenth century will certainly not be its own historian; for amidst all this chaos the most decided feature is skilful reproduction from the classic period downwards. Perhaps we are as yet only struggling in search of the great principles that may be the guide of future generations; or probably the time may have gone by for the development of any individual or national style; but certain it is that at a particular stage of progress, decoration becomes not a mere luxury, but an absolute necessity; and just as there are laws which govern all our other efforts, so must there be axioms of art which cannot be violated with impunity any more than the laws of mechanics. Of late the naturalist school, as it is termed, has made great progress, and, indeed, seems to be the only style, or rather manner, likely to become the characteristic of the present age. The principal fault committed by the adherents to this style, is the too common substitution of what should be the decoration for the thing itself which it ought to have decorated, as in the appropriation of flowers and other natural objects, in total defiance of their relative proportions, for fruit dishes and other purposes which they are unfitted by nature to perform. Natural ornament is no doubt very beautiful, but it is monotonous unless aided by conventional treatment; that is to say, unless its lines and development are arranged according to conventional rules, which are alike for all styles, the differences observable in the various tastes being only differences of materials; and it must be obvious that the motive of decoration cannot be merely to present to the mind natural objects, but to so dispose and treat them that they may be in harmony with the general form of the objects decorated, and in no case should they be independent of the general effect.

Having premised thus much, we will now come to the subjects, the engravings of which will be found in the next page. The first is a design for a chimney-glass frame, in which the story of Narcissus becoming enamoured of his own image is happily conveyed, and the ornament is partially composed of flowers emblematic of his passion and its object. It is supported on either side by two nymphs of the fountain. The other engraving represents half of a design for a picture frame in the Italian style, and pre-eminently suited for carving, which is abundantly testified by many gorgeous interiors of the seventeenth century still existing amongst the palaces of Italy, and in some few instances in this country; indeed, it was in the first half of the sixteenth century that this style attained its utmost development, when the carver was associated with the architect in interior decorations, and when the genius of Raffaelle did not disdain to employ his pencil in the creation of a new style—"the arabesque"—which was eagerly caught up and extended by his pupils, Giovanni da Udine (who was the principal assistant of his master in the production of the arabesques in the Vatican), Giulio Romano, Primaticcio, Giulio Clovio, and others. After a lapse of about fifty years, the style became corrupted, and in the course of a century had merged in another; after which period the art of carving continued to decline, until at length a period of profound repose, during which scarcely anything was attempted to call in requisition the abilities of the artist, was succeeded once more by the association of the architect with the wood-carver, in the persons of Wren and Grinling Gibbons. Gibbons, with the hand of a master, pressed into his service materials which his predecessors would not have dared to venture upon,—such as lace, net, weeds, ferns, flowers, &c.—materials requiring no slight knowledge or power to produce an effect. Thus he became the founder of a new school; and though he worked from nature, and used but a limited variety of flowers, these are of a character to be boldly and effectively worked. The principal remains of his carving in London are those at St. Paul's, where the flower-work of the choir, screen, organ, and the principal portion of the stone ornament, both within and without, are his production, and may be easily recognised from those portions executed by the Flemish carvers employed on the work, by their style being more various in their materials, but having been executed for a nearer point of sight. The general effect of the latter is that of a confused heavy mass at the required distance; whilst with that of Gibbons the general relief has never been forgotten; and not the least point of merit in his productions is the exquisite consistency they possess, to an extent far beyond any other master of the art. His ornaments were all in character with the object he was called on to decorate; nor did he ever overload his compositions with ornament, or throw away labour on any portions not destined to court attraction. The more delicate points of his work were always so managed as to be out of the reach of accident, and were thus made secure; a fact to which the wood-carvers of the present day would do well to turn their attention, it being no uncommon thing now to find articles with such an excess of decoration, both as to character and dimensions, as not only to run great risk of being injured itself, but as to be a positive inconvenience to its use. We would here also point to another very common fault,—namely, the inequality of execution of different parts of the same work,—one part entirely destroying the effect of the other, as in cases where figures, &c., are mixed with conventional ornament, the latter will often be found perfectly well understood and executed, whilst the former betrays the most barbarous want of knowledge both of principles and practice. Between Gibbons and the present time there have been scarcely any names worthy of note in the history of the art, for Chippendale, who lived in the time of George I., is but an illustration of how far it had declined towards the middle of the eighteenth century; and the productions of Demontreuil, who was at this time enriching the collections of our Gallic neighbours, are but the trifles, exquisite though they be, of the art.

Now, however, that much of the work, such as cornices, mouldings, and other works in low relief, which were formerly done by hand, are cut by machinery, it becomes more and more necessary that those who aspire to be called carvers should cultivate a knowledge of such artistic principles as will raise them beyond the level of mere mechanics; and it is in the hope that such a change is indeed already taking place, that we have lately perceived with much pleasure an effort to effect the introduction of the method of "pointing" used by sculptors for the attainment of greater accuracy in copying the plaster model than is possible by the means hitherto in use. Of course, in important subjects, where models are made, every means which will facilitate their being truthfully copied must be hailed as a boon. Indeed it is only a wonder that a process found so practically necessary in sculpture should never before have been employed in the labours of an art so nearly allied to it.

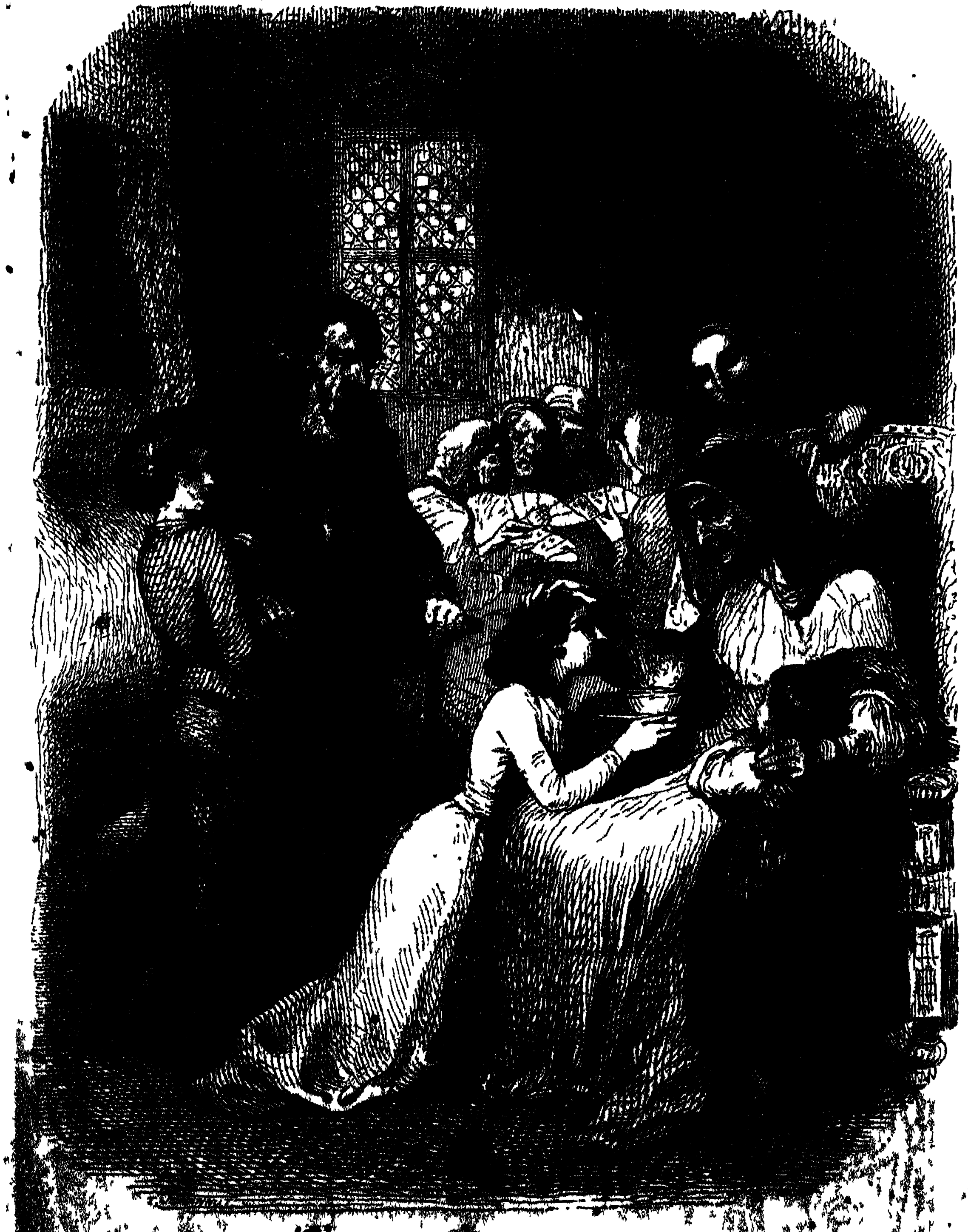


CHIMNEY-GLASS FRAME.



PICTURE-FRAME (IN THE ITALIAN STYLE).

THE FOUR AGES; FROM DESIGNS BY T. JOHANNOT.



IV. OLD AGE.

It has been wisely ordained that every period of life should have its peculiar pleasures and pains. In youth we are continually looking forward into the future—the dim, uncertain, but glorious future; in manhood, amidst the noble strife of the world, we are no less anxiously intent on the present. For old age is reserved the past. Youth has its hopes, manhood its enjoyments, old age its recollections. Unto how many different objects has the life of man been likened,—to a river which, bursting impetuously from its mountain bed, seeks the plain in haste, and tumbles headlong in its course, over rocks and trees, till, having attained the quiet valley, it brawls contentedly away and loses itself at last in the great eternity of ocean; to a summer's day, which rises fair and clear, and bright with many colours, and sets at evening in a dull gray sky; to a battle-field, on which many are assembled and from which few return. And so each period of our life has been assigned its separate duties and its peculiar feelings;—to youth, obedience and love—to manhood, impulsive action, and resolute inflexibility of purpose—to old age, experience. We have all of us an affection for the aged, especially when they are allied to us by ties of friendship or family; and it is affecting to witness the patriarch of a house surrounded by the children of another generation. That venerable old man with whitened beard and shaking hand was once as young and bold as he on whose arm he leans; and that old woman's withered face was once as fair and ruddy, and her eyes as bright and sparkling, and her scant elflocks as rich and flowing, and her figure as full of grace and beauty, and abounding love, as that of the sweet granddaughter who tends her now. The artist has drawn a picture full of incident,—a painted story, in which each may read as he may, of love, and tenderness, and duty, and grateful recognition; prattling childhood, hopeful youth, thoughtful maternity, and serene old age;—ay, and gossipping, scandal-loving, card-playing, palsied, withered, dishonourable old age as well. Every picture has its dark features as well as its bright forelights, or it would not be true to nature.

For that old man exists the past. It is his life. With him, the toils of the world are over—

"Banner and flag are furled,
Glory and valour waned"—

and the dim eye turns lovingly to the prospect of a long, long rest from labour. The busy finger is no longer pliant as of old, the arm no longer strong to wield the axe or cleave the yielding waters; the sounds of the strife without no longer thrill through his heart like the voice of a trumpet; the march of the time is unheeded altogether, and the great heart, which was wont to almost burst its prison doors of old, lies now a cold and pulseless thing, within his bosom. The conflicts of the world are passed with him, for ever; one other struggle, and then the story of his life is told.

And into that old man's memory how many incidents may be crowding now! The events of the present are lost and buried in the past. He is a child at school, that graybeard, once again. He goes down the old lane, oh how well remembered! and gathers flowers from off the old green banks and hedges, or stands upon the sea-shore looking for the pink and yellow shells, even as he used to do seventy years ago. He whoops and calls upon the village green, but no young voices echo back his own; he stands again beneath the old elm-tree, and watches, in his fancy, how swift the schoolboys run, and with what sturdy arms they swing the bat; he visits every spot familiar to his boyhood, and tracks the steps of a little child that once was lost in the depths of the brown wood, and feels such pity for it as none else can, for the little thoughtless child is now an old man; he looks back through all the changing years of a long life, and thinking of these things, says gently, as he wanders feebly through the room or walks for a little in the garden leaning on his grandson's arm,—"Fifty years ago—fifty years ago!"

And then when the end is nearing—when the hum and bustle of the world is becoming more faint and distant—when the things of yesterday are all forgotten, and the memory is busy with the events which happened half a century ago—when the wealth and the work of the day are left for others to take heed of—when the step becomes slow and uncertain, and the voice dwindles down to a "piping treble," and the

"Last scene of all
Which ends this strange eventful history"

is soon to take place—oh, then, what a happiness for the good man to look back upon a well-spent life. He was young as you, and now is old; he stood forward—it may be as you stand now—amid the bravest and the boldest of his time; he wrung from the hard hand of fortune the heritage of name and fame; he fought in the bloodless field of politics that his children and his children's children might have room enough for their great energies; and he rested not till he had secured for them a freedom which their fathers knew not; he believed that in this world none are so weak or insignificant but that the weakest hand and the feeblest voice may be raised in the van of human freedom; and now that he has come to lay down the charge he has held so worthily, he places his hand upon your heads and blesses you, oh, children of a later civilisation, and calling upon God to forward the good work of progression in the world, resigns his life in the belief that

"It hath conquer'd the might of time and space
And broken the bars of clime and race."

Old age, no less than youth and manhood, has yet its task to perform—and that task is the teaching and admonition of youth. Society is composed of many separate elements,—wealth and poverty, the extremes of character and the extremes of age, meet together in one city, and sometimes even in one house. A child is born into the world. It is nothing extraordinary, the same thing is taking place every minute; the child grows up to be a man, and feels himself alone. Love is natural to man, and so he loves and marries, and has children of his own, and grows old; and the wife of his bosom, the mother of his children, grows old and grey likewise; the children grow up too, and take their separate ways—the boys seek their fortunes, and the girls get married and have little ones of their own; and the old pair are left alone as they were when they were first married. Happy for them if they have so passed the years of their lives as to command each other's esteem; happy for them if they have brought up their children in the strait and narrow path; and happy for the children if they listened to the voice of wisdom, as spoken by that aged pair, and wandered not away from it. A family like this is a picture pleasing to contemplate; it is a source from which love, and faith, and sweet associations, are ever springing. A bond of union is among them which unites one generation to another; and from the bosom of such a family—as from the depths of a well-governed and happy nation—spring every social, and private, and public virtue. Transfer the members of that family to the uttermost ends of the earth, and they will carry with them the good seeds sown in that quiet and well-ordered home. And so, at last, shall the good father be known in the good son throughout all generations; and as many as come from that house shall be blessed.

IMPOSSIBILITIES.*

The history of civilisation is little else than a series of struggles against "impossibilities." The lives of great men are but a series of efforts to throw discredit upon the word and make men doubt its value. Ever since the world began the enemies of reform have intrenched themselves behind barricades built up with impossibilities, and hurled defiance in the teeth of advancing ages. Stone by stone these defences have been pulled down, but nothing disheartened they have retreated still farther, and shout out their old war cries, more faintly, perhaps, but no less doggedly and courageously than ever. How many pages would it take to recount the impossibilities that have been made possible by the courageous perseverance of a small minority of mankind from the time when Socrates preached his anticipated Christianity, down to the building of the Crystal Palace! What a strange history would that of *vanquished impossibilities* be; how full of blood and tears, of unrequited labour, of deferred hope, of disappointed ambition, of unsuccessful effort, of persecution, trouble, and vexation; how many brave hearts have been crushed and broken by the heap of impossibilities flung upon them by the incredulous world! There never yet was an abuse or absurdity which was not defended by the single word *impossible*; and yet, strange to say, there is not a word in our language whose meaning is less clearly definable. Men seem always to have looked upon the phrase as absolute—as marking out a line beyond which human strength and human knowledge were alike powerless, and have guarded it with as much jealousy as if it were a poor man's landmark. But in reality it has had an entirely different worth and aspect in each age of the world, and in all likelihood to each man who lived in it. What is impossible for people in one stage of cultivation is comparatively an easy matter to those in another. The savage who steals along the coasts of his native island in a frail canoe, deems it impossible to brave the perils of the stormy ocean far from the land, and beyond reach of assistance; and the sailors who had twice sailed round the world, braved the icebergs of the Arctic seas, and the sweeping currents of the southern ocean, thought it impossible to bid the winds defiance, and arrive on a given day in ports at either side of the Atlantic. These two facts illustrate well the conservative tendencies of the human mind, when but partially controlled by reason and education. All men are rank tories by nature. Experience and the influence of circumstances may modify their creed; but they still, as a general rule, have a hankering after old ways, and a truly patriarchal love for impossibilities. They pet and foster them, and endeavour to palm them off upon the next generation as invincibles whom it is dangerous to approach. This infirmity has been handed down like a great heirloom from father to son, and its growth has been encouraged by erroneous religious notions. For many centuries in the world's history men were unable to draw an exact line between humiliation of the creature, and insult to the Creator. Forgetting how much of the divinity lives within us, they laboured studiously to degrade the human intellect, and ascribe its noblest efforts to the machinations of the devil, and have looked upon the efforts of the mind to free itself from the burden of prejudice and superstition as the tortured workings of an unclean spirit. Happily for our race, God in his own wise purposes ever left amongst us a few men of strong faith and earnest purpose who did not see as others saw, nor heed "the voice of ages." Strong in their own belief, when grave heads cried "Impossible!" they answered, "It can be done," and later generations taking up the cry, faintly sung through the mists of futurity, "And it shall."

It is impossible. Was ever common phrase so dangerous to use, so entirely dependent for its value upon the amount of knowledge that he who utters it can bring to support it! Men assert things to be impossible because they are contrary to the laws of nature. These laws of nature, so often spoken of but so little understood, are far from being immutable canons laid down from all eternity for the government of the world. They are in reality, as we speak of them, merely a digest of the results of our own observation; and just in proportion as our observation has been confined, our experience limited, our power of collation and arrangement defective, in the same proportion is the probability that our conclusions are faulty, and *our* laws of nature are founded upon false data. A curious instance of this is furnished in an anecdote related by Locke of a certain king of Siam, who, when told by some Dutch merchants that in their country water became so hard in winter that men and horses and carts could traverse it, laughed them to scorn, and drove them from his presence as impostors. Nothing of the kind had ever occurred within the range of his experience, nor had he ever heard of such a phenomenon from any of those with whom he was in the habit of associating; in fact, so contrary was it to all his notions of the probable, that he held it to be a fixed law of nature that water must always remain fluid. And had science been then in a sufficiently advanced state to allow of his informants freezing it before his eyes, he would doubtless have ascribed it to magic, and still refuse to believe that such an operation was ever performed by nature on a large scale.

A handful of nitre thrown into boiling water would have at once produced the substance which in northern climes places bridges over rivers so strong that his largest elephants could have traversed with safety, and floating mountains which threaten the navigators with destruction. And had Lucian the laughing, witty sceptic, who dealt such damaging blows to the heathen divinities, been told that his fable of Æsculapius ascending to the heavens, accompanied by a dog and a snake, could now be realised in the person of hundreds of the god's disciples, and that balloons that enabled men to pierce the clouds were now familiar to every one, he would doubtless refuse to believe that they were aught else than the production of sorcery or witchcraft. But were his attention called to what takes place when a hurricane tears up pines from Mount Ida, and hurls them into boisterous waves below, he would doubtless, learned and discriminating as he was, confess that his notions of impossibility were rendered crude and inaccurate from the deficiency of his knowledge. He would see that the confined air in the pieces of the wood brought the trunks floating to the surface, and would admit as an analogical conclusion that a lighter body than the atmosphere would, in the same manner, if enclosed in an envelope, rise through the clouds.

Impossibility, too, is a phrase of widely different import in different neighbourhoods of the same country, or even of the same city. Stories that would be received with implicit faith in Belgrave-square, would be rejected with scorn in Whitechapel, and vice versâ. And not only is impossibility thus relative to the state of our knowledge, cultivation and civilisation, but there are no exceptions to the rule that impossibility cannot be defined. Some that appear so, are not so in reality. If a man says two and two do not make four, we cannot say that this is impossible, for he does not assert a fact, but an opinion, necessarily a contradictory one, and its absurdity is due to the distortion of ideas in his own mind. His assertion is not a *wrong* fact, but no fact at all. And if a witness in a court of justice asserted that a man committed a murder in a certain place, and another proved that in half an hour after he was in another place two hundred miles away, the judge even in such a case as this could not say that what was stated was impossible; he could only refuse to believe it on the ground that so contrary was it to all his previous experience of speed in travelling, that the evidence of the one witness was not sufficient to weigh down the opposing scales. Instances like this might of course be enumerated *ad infinitum.*

We have adduced enough to elucidate our meaning.

We cannot do more than glance at a thousand other things, discoveries in science, reforms in law, improvements in education, and every other branch of the social and political machine, which thousands of voices pronounced impossible. We shall probably review them in greater detail at some future period.

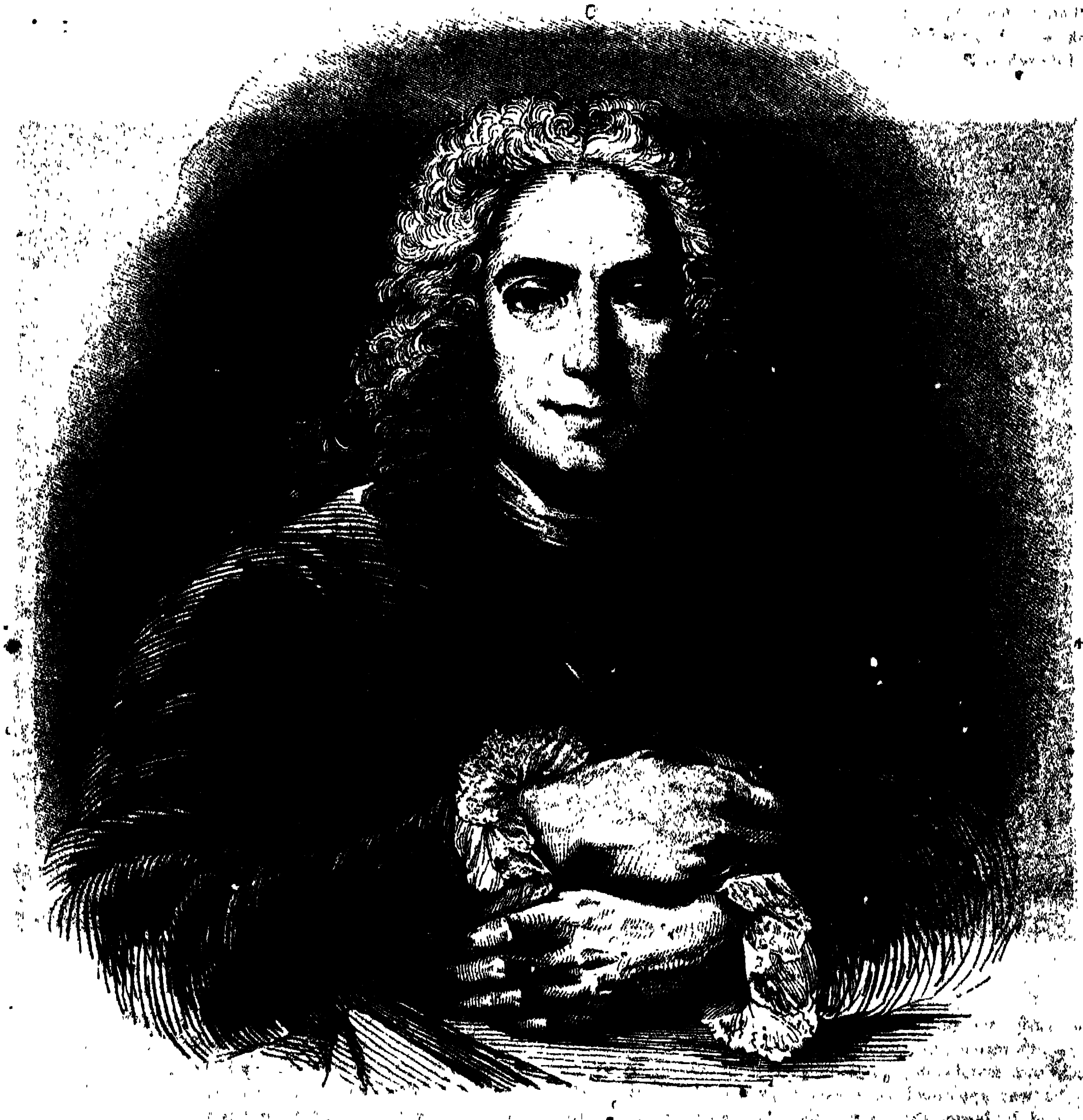
THE MAHOGANY TREE.

THE MAHOGANY TREE (*Swietenia mahogani*) is one of the most elegant, if not the largest, of the country in which it is found, and frequently grows in the crevices of rocks, and other places of the same description. The appearance of so large a vegetable production in such a situation is extremely curious and picturesque, and is to be accounted for from the construction of the seed, which is like that of the thistle, *winged*, or capable of being borne along by the action of the air, and in that manner deposited in holes and fissures in the rocks, where it speedily vegetates and springs up. As long as the plant remains young, the place in which it is found is sufficiently large for its growth, but as it increases in size, the roots gradually but irresistibly force asunder the walls of their rocky prisons, and throw off large portions of stone, thus by degrees penetrating into the very heart of the rock. It is not always, however, found in those situations, the largest timber being produced in some of the flat and marshy spots on the coasts of America; of this description is that known by the name of *Honduras Mahogany*, which is much looser in texture and of less value than that from the mountainous districts of Cuba and Hayti. This last kind is known in commerce as *Spanish Mahogany*, and is chiefly purchased for the purpose of being cut into veneers. The introduction of this wood into England took place about the end of the seventeenth century, in the following manner:

A London physician of the name of Gibbon, had a brother the captain of a West India ship. On his return to England, he had several logs of mahogany on board his vessel for the purpose of ballast, and as his brother was at the time employed in a building project, he made him a present of the wood, supposing it might be useful; his carpenter, however, cast it on one side, observing that it was of too hard a nature to be worked. Some time after, Mrs. Gibbons being in want of a box to hold candles, the cabinet-maker was directed to make it of this same wood; he, in his turn, made the same objection as the carpenter, and declared that it spoilt his tools. Being urged, however, to make another trial, he at length succeeded; and, when the box was polished, the beautiful colour of its grain was so apparent and novel, that it became an object of great curiosity, and attracted the notice, among others, of the Duchess of Buckingham, for whom a bureau was made of the same material.

Before this time it had been used partially in the West Indies for ship-building, but this new discovery of its beauty soon brought it into general use in the making of furniture. The chief supply, at the time we are speaking of, came from the Island of Jamaica, and the wood it exported was of the finest description; but since then, the constant demand has nearly exhausted the island, and it is now, as we have already said, chiefly brought from the Spanish Main and several of the larger West India Islands. There is a species of Mahogany which grows in the East Indies, the *Swietenia febrifuga*, which grows to a much larger size than the American tree, it is also much heavier, but the colour of the wood is of a dirty dark red.

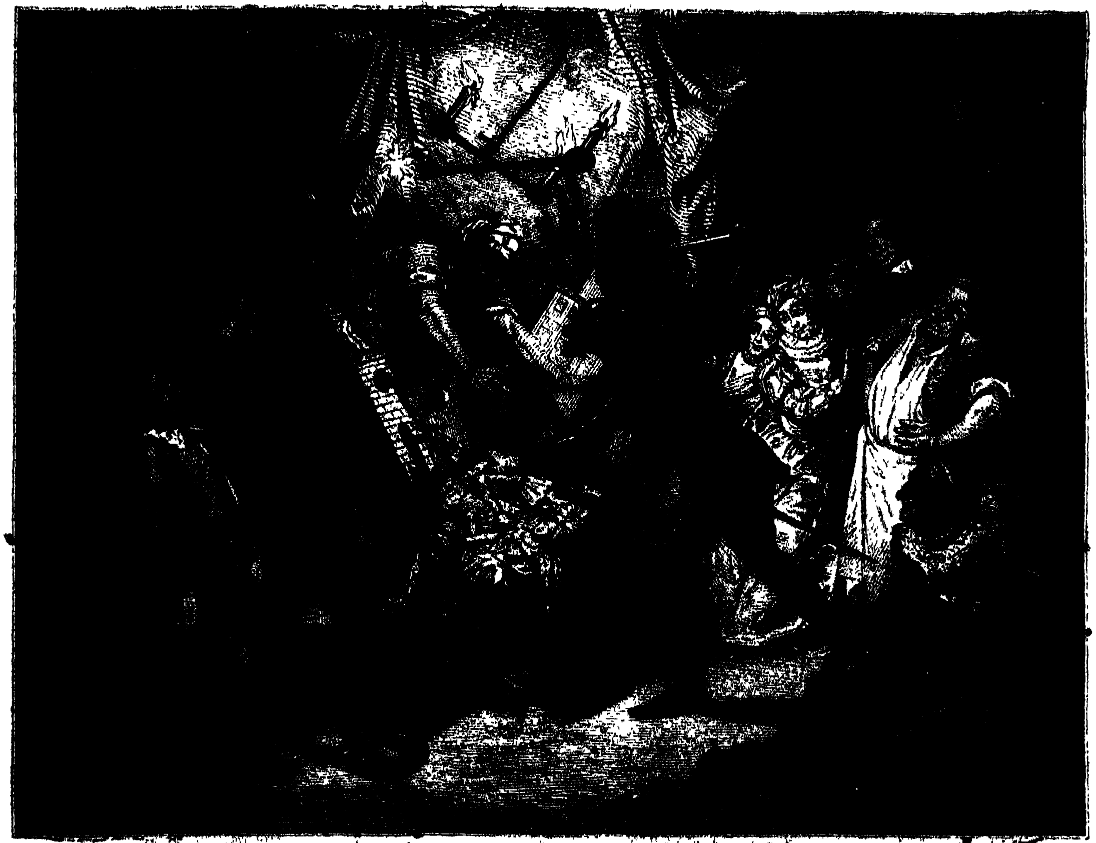
CHARLES ANTOINE COYPEL.



DRAWN BY BOCOURT.

The family of the Coypels is, perhaps, the most distinguished in the history of French art; not so much, however, on account of the great eminence of any one of its members, as for the degree of considerable excellence to which so many of them attained. It gave to France four painters, who, though differing widely in style and merit, left rich contributions to the galleries of their country's art. Noel Coypel, the first of the family who attained any reputation, was born in 1628, and died in 1707, having reached the distinguished rank of Director of the French Academy, and leaving behind him two sons, Antoine and Noel-Nicholas, who amply sustained their paternal reputation. Antoine, his father's pupil, was born in 1661, and accompanied his father to Rome, where he studied the works of the old masters. He afterwards travelled for improvement in Lombardy, and, on his return to France, had made such progress in his profession, that at the age of twenty he was elected a member of the Academy. His subsequent career as a painter abundantly realised the hopes which this early distinction implied. In 1714 he attained the highest rank in the Academy, and in the following year was appointed first painter to the King, and ennobled on account of his merit. In 1719 the Duke of Orleans, who became regent after the death of Louis XIV., employed him to paint the gallery of the Palais Royal, and conferred upon him a pension of fifteen hundred francs. The most distinguished of his works, which are nearly all in Paris, are his "Four subjects from the Æneid," in the gallery of the palace; "The Assumption," and "Christ disputing with the Doctors," in the church of Notre Dame; "The Judgment of Solomon," and "Athaliah," which are in the collection at Versailles. Besides these productions of his pencil, he published two works on his art, entitled, "A Letter on Painting from a Father to his Son," and "Twenty Discourses on Painting," the latter of which appeared in 1721, and was dedicated to his patron the Regent. He died in the following year, leaving behind him the son whose name stands at the head of this paper. Noel Nicholas, less distinguished than his brother, was, nevertheless, skilful and spirited in design, and a lively though somewhat affected colourist. His works, of which the subjects were chiefly pastoral, display much of the mannered and artificial style of the French school, and did not attract much attention during his brother's lifetime, but he afterwards rose in reputation till the time of his death in 1734.

Charles Antoine Coypel, whose portrait we have engraved, was the last of this family of painters. He was born in Paris, in 1694, and, though he early displayed a taste and aptitude for art, owed, it must be confessed, the distinguished position which he attained, more to favour than to the greatness of his intrinsic merit as a painter. He profited well by the example and instruction of his father, but nature had endowed him with a different order of genius. His talents were more versatile, and, consequently, less fitted to win for him, by themselves, an elevated rank in the higher departments of art. In this respect, he can hardly be said to have realised the high expectations so sanguinely expressed by his father in the epistle to which reference has been made. Several of his pictures, however, afford sufficient evidence of ability to prove that it was rather a want of perseverance in cultivating the higher elements of art, than a deficiency of talent, which prevented his attaining a rank second to very few of his country's painters. In boldness of design and delicacy of colouring he had but few superiors. At the early age of twenty-one, his proficiency, aided by his father's reputation and influence, was sufficient to secure his election to a membership of the academy, of which, five years later, he was appointed an assistant professor. Shortly after this period, he began the work which has mainly won for him his reputation as an artist. It consisted of a series of illustrations of the adventures of Don Quixote, one of which we have engraved. The colouring of those pictures shows how closely their author had studied the works of Rubens, during his stay in Florence, and subsequently at the palace of the Luxembourg at home. Indeed, in these best of his paintings Coypel's main defect, want of a peculiar style, is strikingly prominent; his conception was good, though not grand, but his execution showed him to be even more than an admirer of the great Flemish master. They were produced, however, at a period when France had but little to boast of in art, and though inferior, perhaps to the works of his father, they deservedly gained for him a high reputation at the time. With the source from whence the artist drew his inspiration, no one can be unfamiliar. Every one is acquainted with the knight of La Mancha, who, losing his reason over his books of chivalry, imagines that he lives in the times of paladins and enchanters; who, resolved to imitate Amadis and Orlando, whose histories he has read with such delight, mounts his lean and ancient steed, braces on his rusty armour, and traverses woods and fields in search of adventures. Every common object is transformed by his poetical imagination. Giants, paladins, and enchanters, meet him at every step, and all his misfortunes are not sufficient to undeceive him. With this splendid satire we are all familiar. Robinson Crusoe is not more intimately bound up in the memories of our youth, than is this inimitable creation of Cervantes. It has earned a literary immortality for its author, and made his name a household word all over Europe.



DON QUIXOTE ATTACKING THE MARIONETTES. FROM A PAINTING BY COYPEL.

Paintings which at all faithfully illustrated the wit and humour of such an original, could not fail to gain wide and lasting popularity for their author. Everybody's imagination was already prepared to appreciate works embodying such inimitable characteristics. How far Coypel has succeeded in doing so in the picture of which our engraving is a copy, the reader must judge for himself. The scene which he illustrates is certainly one of not the least amusing in Don Quixote. Building upon the reader's recollection of it, we need merely give a brief outline of the immediate antecedents. Don Quixote and Sancho Panza have put up for the night at an inn, where a strolling puppet-showman arrives with his *marionettes*. "Master Peter," as his name is, proposes a performance, for the amusement of his fellow lodgers, and the benefit of his own exchequer. His play, to quote the boy who interprets the dumb show, "treats how Don Gaiferos freed his wife Melisandra, who was a prisoner in the hands of the Moors, in the city of Sansuena, now called Saragossa," in Spain. The fair captive is declared to be the daughter of no less a personage than Charlemagne, who comes forward on the stage and upbraids his lukewarm son-in-law for not attempting the rescue of his spouse. Inspired with sudden courage by these imperial reproaches, Don Gaiferos buckles on his armour and gallops off for Spain. On reaching the tower where pines the fair Melisandra, he at once discovers himself, and, with a speed more practicable in theatricals than in real life, places her behind him, and turns his unwearied steed towards France. The escape, however, is perceived, and a large and brilliant body of Moorish cavalry sallies forth from the city in pursuit, with trumpets and kettle-drums in full play. What follows must be given in the words of the book:—"When Don Quixote saw this numerous cohort of Moors, and heard the martial din of the military instruments, he thought it would be advisable for him to succour those who fled. Accordingly he rose from his seat, and cried in a voice of thunder, 'I will never consent, while I live, that in my presence such an outrage as this be offered to so famous a knight and so daring a lover as Don Gaiferos! Hold, base-born rabble, follow not nor pursue after him; if you do, prepare for instant battle!' As he spoke he unsheathed his sword, planted himself close to the show, and, with violent and unheard-of fury, began to rain hacks and slashes upon the Moorish puppets, overthrowing some and beheading others, maiming this and demolishing that. Among a great many of the strokes he fetched one with such force, that if Master Peter had not ducked and squatted down, he had chopped off his head with as much ease as if he had been made of sugar-paste. Master Peter cried out, 'Hold, Signor Don Quixote, hold, and consider that these figures you throw down, maim, and destroy, are not real Moors, but only puppets made of pasteboard; consider, sinner that I am! that you are undoing me, and destroying my whole livelihood.' For all that, Don Quixote still laid about him, showering down, doubling and redoubling, forestrokes and backstrokes like hail. In short, in less than two *credos* he demolished the whole machine, hacking to pieces all the tackling and figures, King Marsilio being sorely wounded, and the head and crown of the Emperor Charlemagne cloven in two. The whole audience was in consternation, the ape flew to the top of the house, the cousin was frightened, the page daunted, and even Sancho himself trembled mightily: for, as he swore after the storm was over, he had never seen his master in so outrageous a passion."

This translation, though it correctly enough conveys an idea of the adventure, but very distantly approaches the inimitable beauty of the original, which exhibits the nobleness, the candour, and the simplicity of the ancient romances of chivalry, together with a liveliness of colouring, a precision of expression, and a harmony in its periods, which have never been equalled by any other Spanish writer.

Coypel's series of illustrations extended to twenty-five, which were engraved by Surugue, Ravenet, Lépicié, and the other principal engravers of the day. He subsequently added another painting to the series, but it was not engraved. Two editions of the twenty-five were published, different in size and price, and the publicity thus given to them added greatly to the artist's reputation. The estimation in which they were held may be inferred from the language of the preface to the smaller edition, written by Pierre de Hondt: "The collection of the principal adventures of Don Quixote de la Mancha, which the celebrated Charles Coypel has given us, about the time of the majority of Louis XV., is, without question, the best and most valuable of the many collections of that description; inasmuch as he neglected nothing, especially with reference to the manners customs, dress, and other usages of Spain, from whence he had been so particular as to have drawings sent him, taken on the spot, and executed so faithfully, that even in the opinion of the Spaniards themselves, they were perfect representations of the original objects. The engravings of these pictures, which were published at the time, were so well received, so generally sought after, and so promptly purchased, that they soon became scarce, and consequently, of an excessive price."

After having discharged the duties of professor and assistant-rector, Coypel was unanimously raised to the highest dignity in the academy, that of director, in 1747, having in the previous year been appointed first painter to the king. From this period, however, his duties at court and at the academy, the part which he took in advancing the French school of painting at Rome, the efforts which he made with M. de Caylus to publish etchings of the most beautiful of the drawings intrusted to his care, as director of the royal cabinet of drawings, all these occupations left him but little time for painting. Nevertheless, endowed with a mind so active and versatile, he still found leisure to execute several large pictures for the churches of Paris, to deliver lectures at the academy on the theory of art, and to compose several comedies in verse, which gained for his name a place in the Parnassus of Titon du Tillet. Referring to these last-mentioned works, one of his biographers describes him sufficiently in a sentence:—"C'était un peintre bel esprit, qui donnait à l'étude du théâtre le temps qu'il dérobait à son art." After enjoying for five years the high dignities to which he had risen, Coypel died, at the age of fifty-eight, "regretted by artists and the republic of letters," says Papillon de la Ferté, "as much for his talents as for his personal qualities."

PEAT AND ITS PRODUCTS.

Amongst the many remedies propounded for the relief of our Irish brethren, few seem to promise more successful results than the manufacture of its bog-earth; for from it may be obtained a great variety of useful substances—tallow, charcoal, sulphate of ammonia, naphtha, oils, &c. &c. In a lecture delivered by Professor Brande, at the Royal Institution, the nature and products of peat were explained, and the uses to which such products might be applied familiarly illustrated. The professor described a peat-bog as a superficial stratum of vegetable matter, which at different depths had undergone, or is still undergoing, various stages of changes and decomposition. The superficial appearance of a peat-bog is that of a mass of half-decayed heath, mosses, rushes, and grasses, the roots of which have successively died away, though the plants still continue to vegetate. The mass is liqueous, and imbued, among other products of slow decay, with humic (from *humus*, the ground), or humus acid: and the abundance of moisture pervading the bog at once affects the character of the peat and the surrounding district.

The upper layers of the bog are usually of a loose fibrous texture, and of a pale-brown colour; but beneath the surface the density of the mass is found to increase considerably; till at last the distinct character of the vegetable ceases to be discernible, and the bog appears almost homogeneous, and of a dark-brown or blackish colour. In the midst of this mass are occasionally found the trunks of trees and some curious geological phenomena, laying in various positions and at different depths. A peat-bog—and, indeed, the entire district—may, therefore, be regarded as the consolidated produce of enormous primeval forests and fields of vegetation, covering in the aggregate millions of acres. It is a fact, no less curious than remarkable, that one-tenth of the whole surface of Ireland is covered with peat-bog, which is not only valuable in itself, but which, if removed, would exhibit a soil beneath eminently fitted for the operations of the agriculturist.

In the lecture alluded to Professor Brande exhibited various samples of peat, taken from the upper, lower, and middle portions of the bog. He particularly noticed the tallow peat of the bank of Lough Neagh, which, from the brilliant flame attending its combustion, is sometimes rendered available as a source of light as well as heat,—for it must be understood, that, until lately, bog-peat was used simply as fuel in the houses of the poor.

Peat may be rendered highly useful for a great variety of purposes; which, however, for the present may be resolved into two,—charcoal, and the various productions derivable from what is called its destructive distillation. When peat is to be converted into charcoal, the plan adopted by the Irish Amelioration Society is to carbonise blocks of bog-earth, partially dried on trays of wickerwork, in moveable pyramidal furnaces—in much the same way, indeed, as ordinary charcoal is produced from the branches of trees. The charcoal thus produced varies considerably in character from the peat from which it had its origin, as well as in the density of some specimens compared with that of others. In stove drying, dense peat loses about one-third, and the light and porous kind as much as one-half its weight; four tons of dried peat not producing much more than one ton of charcoal. When the peat, however, is properly compressed previous to its carbonisation—which a recently-invented machine enables the manufacturer to readily do—the charcoal resulting from the process exceeds in density that made from wood; and for the purposes of iron smelting it is said to be admirably adapted, owing to its great freedom from sulphur. As a purifying and deodorising agent the charcoal of peat is said to be eminently fitted.

The products of the destructive distillation of peat are as various as they are valuable. The elements of peat are precisely those of wood and coal—nitrogen, hydrogen, oxygen, and carbon. If, therefore, we distil peat in close vessels, the products obtained are precisely similar to those which are obtainable from wood and coal under like circumstances. Till lately, the expense attending the distillation of peat has prevented its general adoption. The employment, however, of a recently-invented blast furnace, which differs in principle from that in which iron is melted, by having an arrangement for collecting the products of combustion, has enabled the experimentaliser to obtain ammonia, acetic acid, pyroxylic spirit, tar, naphtha, oils, and paraffine, together with large quantities of inflammable gases from the peat.

These various products are, as is well known, of great use in the arts. Sulphate of ammonia is employed in the preparation of carbonate and muriate of ammonia, in caustic ammonia, and in the manufacture of various manures and fertilising composts; acetate of lime is in constant demand as a source of acetic acid, and of various acetates largely consumed by calico printers; pyroxylic spirit (or wood alcohol), is used in vapour lamps, and in the preparation of several kinds of varnish; naphtha is used extensively for dissolving caoutchouc, for making varnishes, and also for burning in lamps; the heavy and fixed oils mentioned are very useful in lubricating machinery, especially when intimately mixed with other oils, or it may be used as a cheap lamp oil for the production of lampblack; and, lastly, the paraffine, when mixed with fatty matter such as sperm and steatine, forms excellent candles.

Here, then, are no fewer than seven different substances producible from the hitherto neglected and dangerous peat-bogs of Ireland, and which only require the exercise of skill and patience, joined with the careful employment of capital, to render them available for all the purposes indicated.

ROMAN RUINS.

TOWARDS the close of the latter century the classic ruins were the theme of the poets, just as now they dilate upon old abbeys and Gothic arches of the middle ages. There is scarce one didactic poem of that period which has not similes or episodes drawn from the architectural remains of Greece or Rome; nor a garden which was not ornamented with broken columns, giant trees, and mutilated statues overgrown by the surrounding grass. Byron, amongst modern poets, has revelled in these Greek and Roman relics, as Scott has in the Gothic; and Chateaubriand, in his *Génie du Christianisme*, has made the *former* a complete poem, looking at them both from a picturesque and sentimental point of view. "These ruins," says he, "considered in relation to their artistic effect, have a greater charm than if the buildings were entire. In those temples on which time has wrought no change, the walls conceal a part of the landscape, and prevent us from distinguishing the colonnades and arches of the edifice; but when they begin to moulder and decay, they are reduced to isolated masses, between which the eye rests both above and away in the distance, upon the stars, the clouds, the forests, rivers, and mountains. The ruins then seem to harmonise with the scenes around, and this in every case seems to modify and adapt itself to differences of clime and time, and association, whatever be the differences of architecture."

He who wanders amidst ruins that he may give way to reverie, sees little in them but a melancholy contrast. Most people have read Volney's reflections amidst the ruins of Palmyra. "The solitude of death has succeeded to the surging crowds that once thronged these porticoes. The silence of the tomb now prevails where the hum of busy commerce once was heard. The gorgeous opulence of a city of trade is changed to hideous poverty. The palaces of kings are now the lairs of wild beasts. Flocks graze upon the threshold of temples, and filthy reptiles dwell in the holy places of the gods."

It is thus that poets and philosophers, in the majority of instances, express themselves when standing amidst the *débris* of ruined cities. They do not seek to awaken the tender emotions to which Goldsmith gives vent in weeping over the "deserted village." They try rather to draw from a comparison of the present with the past momentous lessons upon the vanity and nothingness of everything human, mourning over the downfall of so many colossal works. *Sic transit gloria mundi* is the burden of all their reflections.

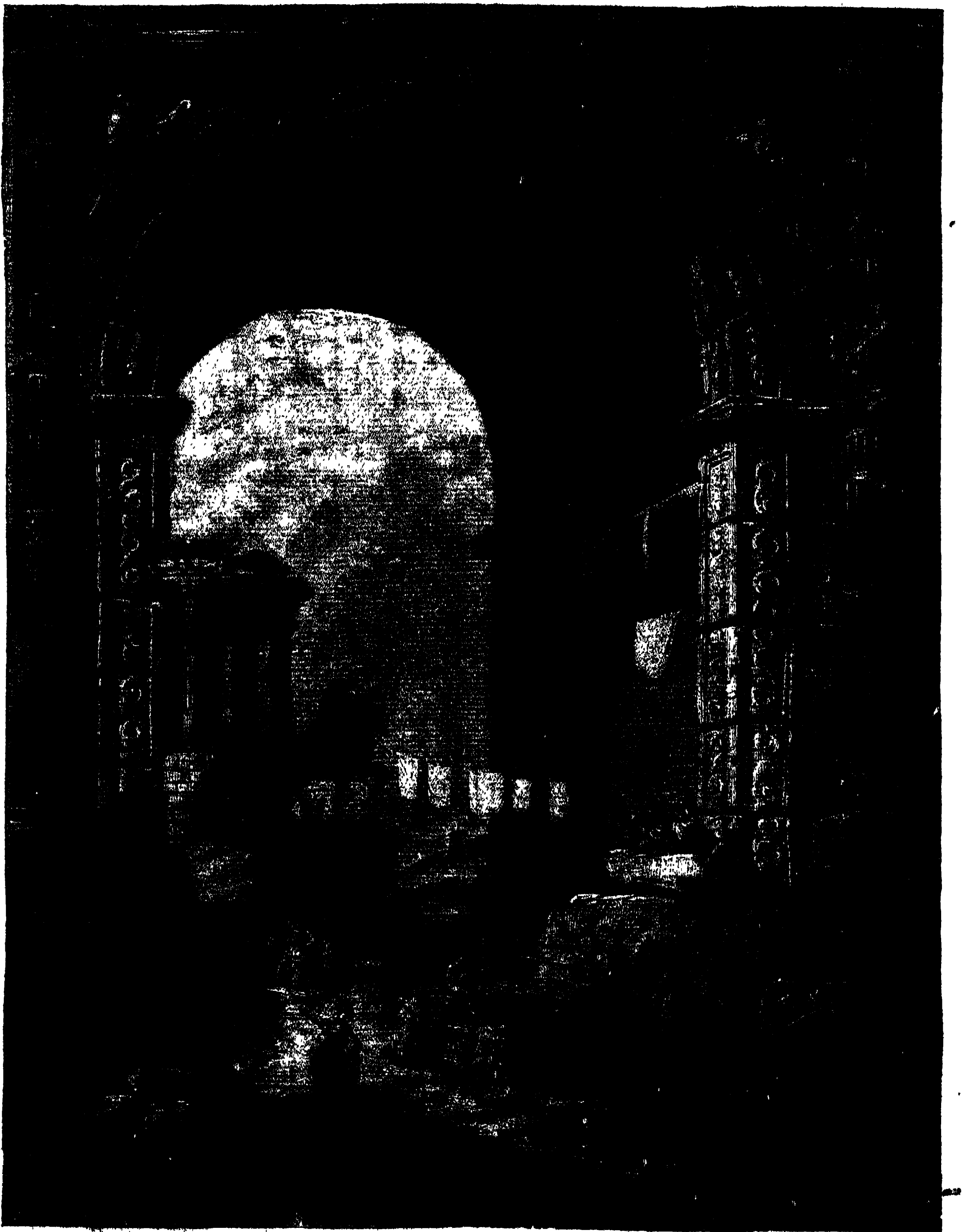
Hubert Robert, the artist whose painting we reproduce, loved Italy above all things, and passed a great part of his roving life, wandering through the catacombs, and the magnificent remains of Roman greatness. Even if he had not belonged to the age in which he lived, and had not partaken of the poetic opinions of the period, this prolonged sojourn amongst the finest relics of antiquity would doubtless have awakened in him the religious and philosophic sentiments which they inspired in others. His paintings seem an exact translation of the works of Volney, Delille, and Chateaubriand. Under an immense triumphal arch appears the statue of Marcus Aurelius; in the background a great temple, and in the foreground broken capitals, and fragments of columns and statues. An old woman has fastened a line for drying her clothes to the neck of the great emperor's horse, and a workman saws a stone in front of a sort of bas-relief, representing a proud Cæsar riding in his triumphal chariot. The intention of the contrast is here so evident,—so little is left to the spectator's imagination that we may doubt whether the general effect is not rather injured than otherwise.

Hubert Robert is an artist, of whom we now seldom hear anything. He was born in 1733, and was elected a member of the French Academy in 1767. Amongst the most remarkables of his paintings are "Cæsar embracing Pompey's Remains," "Ovid," "Arria and Pætus," and "Cicero." He was particularly fond of painting ruins and solitudes. His private collection at Auteuil, in the house in which Boileau at one time lived, contained a great number of works of this sort, which are now scattered all over Europe.

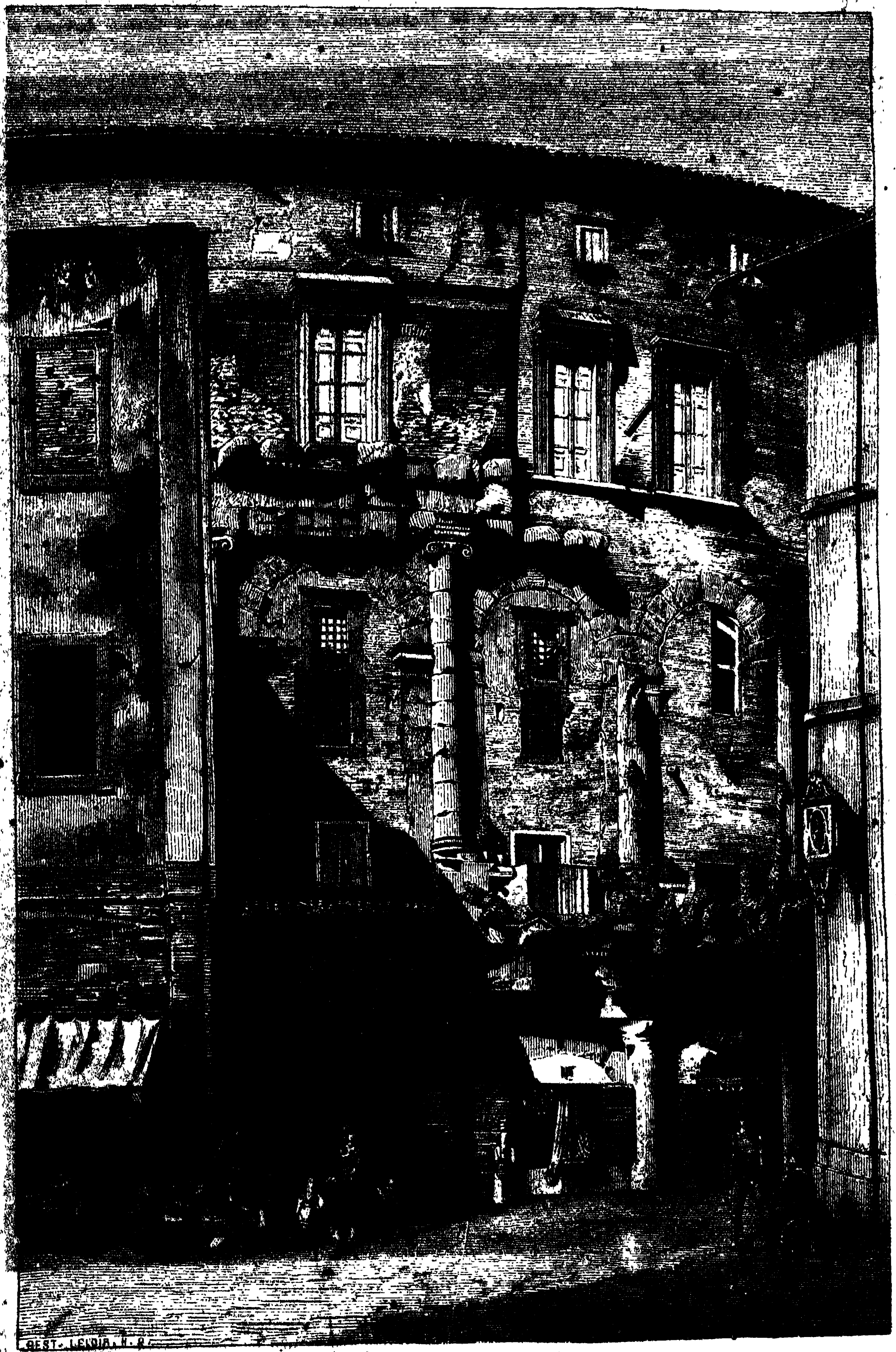
Robert, though remarkable as a painter, was rendered still more so by the singularity of his life, and the strange adventures through which he passed. Italy was for a long time the place uppermost in his mind. To visit Rome, Naples, Sorrento, Capræa, Vesuvius, and see the places rendered illustrious by Dante, Michael Angelo, Tasso, and so many other great men, was the great idea of his life. Filled with romantic dreams he set out on his travels, and on his way was surprised by a tempest not far from the Great Chartreuse, and his horse being frightened by the lightning, threw him violently. He lay senseless until found by some monks passing by, who took him to their convent, and with difficulty restored him to consciousness. Some time afterwards, while rambling in a forest, delighted by the beauties of the scenery, he lost his way, and remained for three days without any food but berries, and in hourly danger of being devoured by the wolves.

At length he reached Rome, and gave himself up heart and soul to the study of his art. It was here that the adventure befel him which has been celebrated by Delille in his poem, *Imagination*. He went to visit the immense catacombs which extend under the city. He was alone, and had no other guide than a piece of thread or string which was fastened at the entrance, and which he held in his hand. He had not wandered very far, when he lost his hold, and his torch going out at the same moment, he was left buried in profound darkness, in the midst of a labyrinth of passages. He wandered for hours, a prey to the most dreadful anxiety, and at last began to despair, and was about to lie down and resign himself to a lingering death, when he was tripped up by some object on the ground, and fell headlong. To his great joy he found that the missing thread was the cause of his downfall; and, starting up, soon reached the entrance once more.

On another occasion he sallied out in the night, and climbed to the top of the Coliseum, where he planted a cross, which was for a long time known as "Robert's Cross." He performed this adventurous feat in the midst of thickest darkness, although it was attended with danger and difficulty which few other men would have cared to face in broad daylight. In the morning the astonishment of the people was great, on perceiving a cross newly erected at such an immense height. A crowd



ROMAN RUINS. FROM A PAINTING BY HUBERT ROBERT.



THEATRE OF MARCELLUS.

assembled; many cried, "A miracle!" while Robert stood amongst them laughing heartily at their credulity. At last, having ventured to assert loudly that the occurrence was by no means wonderful, and that he could plant the cross there himself, the mob set upon him with fury, and it was with great difficulty that he escaped with his life. The Pope having heard of the affair, sent for him, and made him large presents. From that time Robert was known in Italy as "Roberto il Diavolo," or Robert the Devil. He was in Paris during the reign of terror, and was, with many others, seized and imprisoned in St. Lazare. Amongst his companions in misfortune were Roucher, André Chenier the poet, and Lavoisier the celebrated chemist. In this dreadful situation his gaiety and *sangfroid* did not forsake him. He beguiled the tedious hours of captivity by painting landscapes and portraits of his friends upon the plates. One day, while playing tennis in the courtyard of the prison, he heard the voice of the gaoler calling over the names of the sixty victims who were on that day to be conducted to the guillotine. Amongst others, he heard that of *Robert*, and as he crouched in terror in the corridor, another unfortunate wretch answered to it, and mounted the cart, and none knew which of the two was meant.

If men are to be judged by the company they keep, posterity cannot but think favourably of Robert. Amongst the number of his friends were Buffon, Quirinus, Visconti, Vernet, Greuze, Gretry, Delille, Le Rain, Voltaire, &c. It was he who superintended the decorations for the play of *Irene*, on the memorable evening when the patriarch of philosophy saw his bust crowned with laurels; and it was he who received Voltaire's last words. "My friend," said he to Robert on his deathbed, "at what age did Titian die?" "Monsieur," replied Robert, "some say at one hundred; others, one hundred and ten." "Ah," said Voltaire, "he was a happy man; he received an instalment of his immortality while yet living." Robert died suddenly in his studio in 1808.

Our second engraving is not from a work of Robert, but well depicts the present state of one of the finest remains of ancient Rome. The theatre was raised by Augustus in honour of Marcellus his nephew (the son of his sister Octavia), a youth who promised well, and whose early death spread a gloom over the whole empire. Most of our readers may remember the tribute paid him by Virgil in the sixth book of the Æneid, where he describes Æneas as meeting him in Hades. When the poet was reading his work to Octavia, and came to the passage—

> "Heu miserande puer! si qua fata aspera rumpas,
> Tu Marcellus eris"—

she fainted away, and on her recovery lavishly rewarded him.*

The theatre was 540 palmæ in diameter, and could contain thirty thousand spectators. The style of the building was so perfect that modern architects have taken it as a model, whether of the Doric or Ionic orders, or for both combined. It is believed that in the exterior of the semicircular part, which is faced with immense blocks of travertine, and in which the porticoes were, the theatre was adorned with three orders of architecture, but there now remain only the *débris* of the two inferior ones. The broils of the middle ages did it irreparable damage. The families Pier Leoni and Sanelli turned it into a fortress. The Massimi family afterwards used it as a palace, after designs of Balthassar Peruzzi. In latter days it has become the inheritance of the Dukes of Gravina.

After building of the theatre, Augustus erected a superb portico, in which the people might take refuge during showers of rain. It had the form of a parallelogram, with a double row of columns, to the number of 270, and it was decorated with splendid pictures and statues. It was amongst the ruins of this that the far-famed *Venus di Medicis*, which now adorns the tribunal at Florence, was discovered. The emperors Septimus Severus, and Caracalla restored the portico, of which now nothing remains but a few broken columns and pilasters.

Many of the finest of Roman remains were seriously injured during the siege of the city by the French in 1848, and most of them are fast falling before the march of time. The papal government, whatever its faults, has never shown itself averse to the encouragement of art, but its attention has been for a long while too closely absorbed in the suppression of political disturbances to afford either time or opportunity for the preservation of the relics of imperial and republican Rome.

THE HISTORY OF LITERARY COMMERCE.

NOTHING marks more strikingly the progress of the nation during the last two hundred years than the history of literary commerce; nor is there a surer guarantee of its continued advancement at an accelerated pace than the present vast expansion of the book trade, which is about to burst all its remaining shackles, and expatiate in the perfect freedom claimed as essential to the prosperity of all other branches. We find the true principles of political science confirmed by history; and as the argument from facts is the most conclusive to the human mind, the importance of shedding the light of the past upon the discussions of the present day, is evident,—for history is an accumulation of facts.*

One of the first objects of the early printers was to supply the anxious demand of men of letters for copies of the ancient classics, which had been for so many centuries accessible only in costly manuscripts which could only be deciphered by great labour. These first appeared in expensive folios. But the Alduses, Stephenses, and Plantins produced them in neat octavoes and duodecimoes. Instantly the horizon of literature was expanded, light encroached on the realms of "chaos and old night," where ignorance had held its leaden sceptre, and superstition inthralled the immortal mind with its ghostly terrors. At first the market was overstocked, but a new demand was soon created, and the seed cast upon the waters was soon found producing an abundant harvest of readers.

The supply from the stores of the ancient classics was not checked by authority. It was different, however, with the English Bible. Its first translators and printers were persecuted from city to city, and from nation to nation. So great were their trials, so numerous their adventures, and so magnificent were their labours, that the "Annals of the English Bible," published by Pickering, fill two immense volumes. The persecutors spent large sums in buying up the first editions, in order to burn them in piles in the market-place. But this proceeding was almost as blind as the animosity of the Irish peasant who resolved to destroy a bank by burning its notes. By means of this fanaticism the first costly editions went off rapidly, and funds were obtained from the enemy to print fresh supplies, while the burnings seemed as the most effective advertisements, creating a demand that might not otherwise have existed to the same extent. In 1540 Grafton printed only 500 copies of his complete edition of the Scriptures; but the demand increased so rapidly that we have still extant no less than 326 editions of the Bible, or parts of the Bible, printed between 1526 and 1600.

A thirst for education soon resulted from the art of printing. Both in Protestant and Roman Catholic countries schools and universities were founded, for which books were largely demanded; and these, in their turn, produced ever-increasing circles of fresh readers. William Caxton, our first printer, produced 64 works from his press, and his assistant and friend, Wynkyn de Worde, published 408 books from 1493 to 1535. To another of his fellow-labourers, Richard Pynson, 212 are assigned during the same period. The "Typographical Antiquities" of Ames and Herbert records the names of 350 printers in England and Scotland, working between 1474 and 1600, during which time nearly 10,000 distinct works were printed, giving an average number of 75 each year. Compare this with the 2,700 books issued from the British press in 1851, exclusive of periodicals and newspapers!

Long after the introduction of printing books were very dear in England. In 1505, a "primer" and a "psalter" cost twenty-pence, then equal to six days' wages of a labouring man. In 1516, Fitzherbert's "Abridgement," a large folio law-book, the first published, was sold for 40s., the price at that time of three fat oxen. As publishers began to rely on a larger number of customers, books became cheaper. But, during the reign of the Tudors, printing was an exclusive privilege granted by the crown to certain individuals, which of course limited the trade while restricting the liberty of the subject. About two hundred copies of each work is supposed to be the average number printed during this period.

During the politico-religious contest under the Stuart dynasty the press was very active. Two thousand volumes of controversial tracts, issued between 1640 and 1660, are preserved in the British

Museum, and these volumes contain 30,000 separate publications, which indicates a prodigious activity of the national mind during these twenty years. The Restoration was accompanied by the prevalence of profligate literature; and in order to check the growth of anything more wholesome, an act of parliament ordained that only twenty printers should practise their art in the kingdom; and we find that in 1666 there were only one hundred and forty working-printers in London. How characteristic of the age was this act! Restraints upon the commerce of literature, thus carried out fully, strike us as monstrous. But is not this principle the same to whatever extent it may be carried out? And does not the great publisher, who says to the trade, I shall not allow you to sell this book under a certain price, act in his own sphere in the same spirit of monopoly and coercion as the Stuarts did in theirs?

The laws, however, which limited the number of printers soon fell into disuse. From the year 1666 to 1680, the average number of works issuing from the press yearly was 252, two-fifths of which were professional,—connected with law and education. But more than half of these publications were reprints, pamphlets, single sermons, and maps. At the close of the seventeenth century, the ordinary price of an octavo volume was five shillings.

The beginning of the eighteenth century was signalised by the rise of *periodical literature*, and of what we now technically call "the press." In the year 1709 London had one daily paper, fifteen three times a week, and one twice a week; and provincial newspapers were established in several places. In 1724 the stamp duty was imposed. In 1731 Cave produced the first magazine printed in England; so that our periodical literature is only about one hundred and twenty years old. The first magazine was called the "Gentleman's." The booksellers started the "London" in opposition. The "Monthly Review," the first of the critical class, was established in 1749. During the first half of the century, only 5280 new works appeared, giving an average yearly issue of 93. A quarto published during that period seems to have been sold for 10s. to 12s. a volume, and octavo from 5s. to 6s., and a duodecimo from 2s. 6d. to 3s. Before this, an excise duty had been laid upon paper, and the costs of authorship even for the humblest labours were raised, yet prices had not been raised. "We can only account for this," says Mr. Charles Knight, in his postscript to "Caxton," "upon the principle that the publishers of the first half of the eighteenth century knew their trade, and *printing larger numbers, adapted their prices to the extension of the market*. They also in many cases lessened their risk by publishing by subscription, a practice now almost gone out of use, but possessing great advantages for the production of costly works. This was in many respects the golden age for publishers, when large and certain fortunes were made. Perhaps much of this proceeded from the publisher's aiming less to produce novelty than excellence, selling *large impressions of few books*, and not distracting the public with their noisy competition in the manufacture of new wares to catch the passing fancy of the hour. Publishers thus grew into higher influence in society. They had long ceased to carry their books to Bristol or Stourbridge, or to hawk them about the country in auctions. The trade of books had gone into regular commercial channels."

During the latter half of the eighteenth century, literature became rapidly *popularised*. Periodicals spread on every side. Magazines, reviews, and newspapers were greatly multiplied—and the plan of publishing large works in numbers, to meet the wants of the many, was first adopted. Among the most successful of the "number books" was Smollet's "History of England," which realised a circulation of twenty thousand copies. The wider diffusion of periodical literature increased, instead of diminishing, the demand for new books. From 1792 to 1802, no less than 4096 new works were published, exclusive of reprints and pamphlets. The average yearly production was more than three times what it had been during the previous period—and this not by means of reduced prices, for the prices of books had risen from 50 to 100 per cent.

The early part of the eighteenth century witnessed an enormous expansion of the book-trade. During the first twenty-seven years, the new publications amounted to nearly twenty thousand. While the demand thus increased, the prices of books were rising. How are we to account for this? By the principle of *association*, which has achieved such wonders in our day, in all departments of trade and commerce. The desire for knowledge had led to the formation of *reading societies* and *circulating libraries*,—by which means many were enabled to read the principal new works at a small expense. These societies secured a market for a certain number of copies of each work,—and the publishers took advantage of this to raise the price—for which we shall blame them less when we consider that the economical arrangement of societies or companies seemed calculated to limit the number of purchasers. Indeed, it was predicted that they would destroy the trade of publishing. But ultimately, they created a much larger market, by extending the taste for reading. This taste gradually descended in the ranks of society; and produced a demand for books conveying solid information in a popular form, and published at a low price. To meet this novel demand, "*Constable's Miscellany*" was commenced in 1827. In the same year the *Society for the Diffusion of Useful Knowledge* commenced its publishing operations, and, several publishers of eminence soon turned their capital into the same broad channels. The works of standard writers were reproduced at moderate prices, and the thoughtful mechanic was enabled to read at his own fireside the masterpieces of the human mind, and to become a centre of elevating and civilising influence to the people around him. The "Penny Magazine," the "Penny Cyclopedia," and "Chambers's Journal," followed in the same direction. Of these, the most daring speculation was the Cyclopedia. Mr. Knight states, that the work returned about £150,000 to the commerce of literature, and that £40,000 was distributed among authors and artists engaged in its production, of which sum, more than three-fourths were laboriously earned by the diligence of the writers.

Cheap literature, so far from destroying the trade of publishing, as had been predicted, caused a very large increase in the annual issue of new books, so that the croakers from the old roosts of monopoly have been continually disappointed in their dismal prophecies. In the four years ending 1832, were published of new books, 6,149 volumes; in the four years ending 1842 were published 8,597 volumes. The average price per volume in the first period was 11s. 5d.; in the second period 8s. 9½d. This is the estimate of Mr. M'Culloch in his Commercial Dictionary. That gentleman says, that if these works were sold at the publication price, averaging from 8s. to 9s. a volume, the product would be, for new books, £708,498, and for new editions and reprints, £231,218. But he considers that the actual price did not exceed an average of 4s. a volume, which would yield £435,000 a year.

We find by counting the works on the list in the *Literary Almanack*, that the number of books published in 1851 was 2,700. At that rate, the number for the last four years would be 10,800, exceeding by 2,200 the issue for the same period ten years ago; and during the intervening period, be it recollected, the trade in periodical literature has been enormously expanded.

The number of *weekly periodical works* issued in London, on Saturday, May 4th, 1844 (not newspapers), was 60, with a weekly sale of 300,000 copies, read chiefly by the working classes. We believe the present number of such periodicals is not quite 60, but the number of copies issued must be much larger, while the *monthlies* are greatly increased. In May, 1844, 227 monthly, and 38 quarterly periodicals were sent from London to all parts of the United Kingdom. The number of copies sold on Magazine-day was estimated in that year at 500,000, for which cash to the amount of £25,000 was paid. The annual returns for periodical works were then estimated by Mr. M'Culloch at £261,000, others set it down at £300,000.

Last year (1851), were issued from London 327 monthly, and 46 quarterly publications, showing an increase in the former of 100, or nearly one-third, and in the latter of eight or one-fifth over the numbers in 1844. When we take into account 100 weekly papers published in London, each with a literary department, supplying to some extent the place of a Magazine, and supported chiefly by the industrial multitude, we must perceive what a vast revenue *they* contribute to the book-trade. Indeed, we see, throughout the whole history of that trade, that in proportion as it has relaxed its exclusiveness, and considered the many it has expanded and flourished.

THE LADIES' DEPARTMENT.

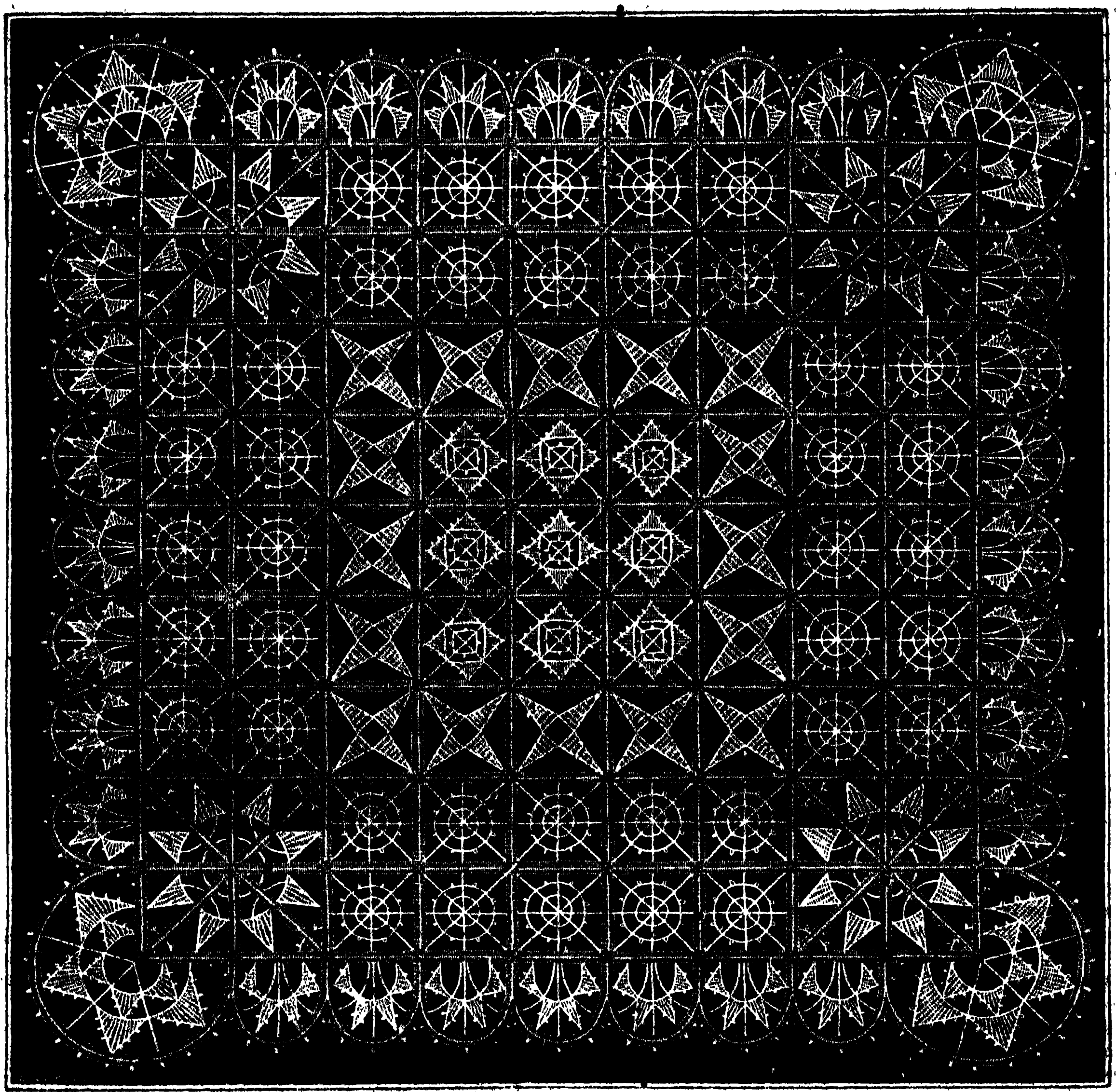
TABLE D'OYLEY, IN ANTIQUE POINT.

Materials.—A d'oyley frame, and Mecklenburgh thread, Nos. 1, 7, 80, and 150.

The d'oyley frame used for making these d'oyleys, is something like that formerly in fashion for d'oyleys in soft cotton and wool. The pegs of this one, however, are of brass, and are forty in number; namely, ten on each side of the frame; and those at the corners are almost close together, sufficient space only being left to allow the thread to pass between them.

The reason Mecklenburgh thread is selected as the material for these d'oyleys, is that linen lasts so much longer than cotton; and they are of a kind that, if properly made, will serve for a century.

Begin to form the bars which divide the d'oyley into squares, by winding the thread No. 1 across the frame, first in one direction and then in the opposite. To make our description clearer, we will call the top of the frame A, the bottom B, the left side C, and the right D. Holding the side A at the top, we will reckon the pegs from the left to the right, Nos. 1 to 10, for A and B; and when we have to work in the opposite direction, we will make the side C the top, and reckon the pegs of C and D in the same manner. It would facilitate the working to put these figures on the wooden frame, as well as the letters, before beginning.



POINT LACE D'OYLEY.

To make the Foundation of the Perpendicular Bars.—Do not take the thread off the reel, but knot the end on peg 1 A. Pass the thread on the right side of this and of peg 1 B, then up the left side of these, again down the right and up the left, twice more, so that a bar of six threads crosses the frame parallel with side C. Pass on the thread, without breaking off, to pegs No. 2, and do the same; and so on with all to No. 10, when it will be necessary to fasten off by knotting the end securely on the peg.

These threads have now to be crossed by similar ones, from C to D. Take a needleful of thread, two yards long, and thread it on a coarse long needle. Fasten the end to peg 1 C, and in passing to the corresponding peg of D, slip the needle under the first three of every six threads; do the same in returning, which will raise the other three. This is to be done three times; then fasten off, and take another needleful for peg 2. All the ten from C to D are done separately, and in the same manner.

The twenty bars, each consisting of six threads, are then to be formed into braids, by darning them backwards and forwards. Use No. 7 Mecklenburgh, and a large needle; fasten on, and slip the needle alternately under each three, taking the stitches as closely together as possible. In working the perpendicular lines in this way, miss those parts where the others cross them, and when you come to the crossings in doing the lines from C to

D, do the same darning from the corners to the centre of the little square formed by the crossing of the threads.

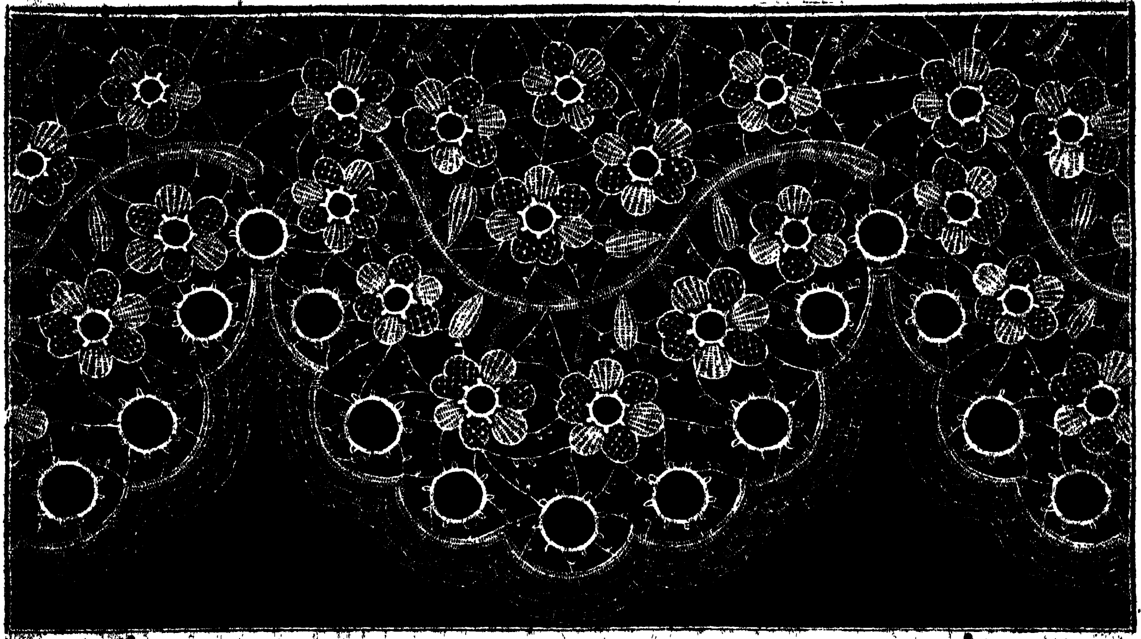
When all the bars are done, slip the d'oyley off the frame, and tack it firmly on a square of parchment, allowing a margin of two inches all round. The square spaces, of which there are nine each way, are then to be filled with point stitches, arranged to form certain patterns.

The Corners.—These are all alike, and every one occupies four small squares. Begin by making diagonal bars (of *four* threads, instead of six), from peg 1 and peg 3 A, slipping the needle through the bar of peg 2, when passing it. The meeting of all these bars forms the centre of the wheel, and all the circles round it are to be done in Mecklenburgh, No. 7. Make one round, a quarter of an inch from the centre, passing the needle through the back of each bar as you come to it, and covering the circle with buttonhole-stitch. A second plain circle must be worked, rather more than a quarter of an inch beyond this one, and short bars, in pairs, connecting the two must be make as seen in the engraving. To make the points of the wheel, work backwards and forwards, in close buttonhole-stitch on each section, decreasing one stitch every row, until you work only one stitch on the point, and connect it with one of the main bars. In each corner of the square, a quarter of a wheel is worked, in a Raleigh bar.

As we have observed, four squares are occupied by each corner wheel,—the spaces between them, which are five squares long and two deep, are all worked in the same pattern,—each is divided by four bars, one perpendicular, and the horizontal one closing in the centre, and two diagonal from the corners. These are single bars, consisting of a single thread, covered with buttonhole-stitch; they are done in 80 Mecklenburgh. Two wheels, a small one, of plain buttonhole-stitch, and a larger, with a Raleigh dot in each section, complete each square. The row of squares immediately within these,—namely, five each way, are filled with Swiss stitch. This being newly introduced, we must describe it. With No. 1 Mecklenburgh, carry a thread diagonally from one corner of a square to the opposite one, do not draw the thread tightly, and twist back on it to the corner where it began. Another twisted thread must be worked between the same two corners. Slip the needle along the braided bar to one of the vacant corners, and carry the thread *under* the twisted bars to the opposite. Twist back on the thread four times; pass *over* one twisted thread, twist three times, pass over the other twisted thread; twist four times more, and this brings the needle to the corner. A second bar must be made in the same way, parallel with this one. The small pointed spaces between each pair of threads is then closely filled with foundation-stitch, leaving a little diamond in the centre. The foundation-stitch must be done in Mecklenburgh No. 7; it is desirable, therefore, in order to use the needleful of No. 1, to make all the twisted threads before filling in any, as the needle can readily pass through the back of the bars, from one square to another. Sixteen squares are to be filled in this manner.

In the centre of the d'oyley are nine squares, all of which are filled in the same way. With No. 80 Mecklenburgh make two diagonal braided bars, crossing in the centre of the square. These are connected at a very small distance from the centre, by Raleigh bars, with a single dot on each. They are worked so as to surround the middle, but in a square, not a circular form. In each section another bar is worked, so as just to clear the point of the Raleigh spot, and this is worked gradually to a point, by leaving out a stitch at each end, every row; making a Raleigh spot, however, *at the end of every row*, and one at the point which is to be joined to one of the main bars.

The Border.—The corner has a large scallop, and a small one is made on the edge of all the intermediate squares. The radiating bars are in the buttonhole-stitch, and the sections of circles have points worked in foundation-stitch, with a Raleigh dot at the end of every alternate row. The outer edge of every scallop is braid-stitch, worked on four threads and finished with Raleigh dots.



DEEP POINT LACE EDGING.

DEEP POINT-LACE EDGING.

Materials.—Mecklenburgh threads, Nos. 1, 7, 100, and 120.

Draw the pattern from the engraving, a section of it being given the full size. The paper must then be lined with alpaca. Should a short piece only be required, the pattern should at once be made of the full length; if not several may be drawn. From the closeness of the work it is impossible to work twice over the same paper.

The border of each pattern is formed of seven small scallops. It is worked in braiding-stitch, that is, four threads are laid on, parallel with each other, and formed into a braid by darning them backwards and forwards, putting the needle always under two together. As it is not desirable to have any break in the outline, it will be advisable to take, for each of the four outline threads a needleful sufficiently long to answer for the whole piece of lace. When the whole length of the paper is done, the ends may be twisted round a card, and wrapped in paper to keep them clean whilst that section of the work is in progress.

Each pattern contains one spray of flowers and small leaves, the stem of which is braided like the edge, only that it is generally wider at the end.

All the outlines are made in No. 1, and the braiding done in No. 7. The flowers consist of six petals, three of which are worked in foundation-stitch, that is, close buttonhole-stitch over a thread, and the others in spots formed by making two close buttonhole-stitches, and then allowing the space of two before working the next. In the succeeding row, the two close stitches come on the bar of thread formed between one spot and the next. The centre of the flower is an open circle, covered with close buttonhole-stitch, with Raleigh dots.

The leaves, which are very small, are entirely in foundation stitch. In each section of the large scallop is a wheel formed by working a circular Raleigh bar, on a foundation of three threads. The ground is in Raleigh bars worked very irregularly.

The straight edge of the lace is a line of buttonhole-stitch on two threads.

Three rows of Sorrento edge, worked one upon another, complete the lace. This edge and the flowers are done in Mecklenburgh 120. The remaining parts in No. 100.

DECEPTION AND CREDULITY IN WORKS OF ART.

"Deception," says Sir Joshua Reynolds, "which is so often recommended by writers on the theory of painting, instead of advancing the art, in reality carries it back to its infant state: the first essays in painting were certainly nothing more than mere imitations of individual objects, and when these amounted to deception, the artist had accomplished his purpose." In one view of art, however, the more perfect the imitative talent of the artist, the greater his excellence. Nature, after all, is the most perfect model; and the more minutely her features are caught up by the painter or sculptor, and represented in his work, the more completely does he realise the loftiest idea of art. We grant that the most perfect imitations of national objects may be utterly destitute of the *æsthetics* of art, the embodiment of which is by some considered the highest achievement of the artist; but then, this representation of the "beautiful" only indicates a deeper insight into nature on the part of him who makes it, and shows that he possesses in addition the power of exquisite execution. In bodying forth the highest phases of beauty, tenderness, sorrow, passion, or any of the other feelings of the mind, he is as much, only in a loftier sense, an imitator of nature as is the artist who copies a limb, a tree, or any other natural object. Not that we would be understood to confound, or put on a level, the widely different merits of two such artists; for *mere* imitation, in the ordinary sense, however perfect, is much inferior to the far higher artistic talent of invention. The one can lay claim to no higher rank than that of a skilful copyist, whilst the other rises infinitely above him, as the originator of ideas drawn from a vivid perception of the moral and physical beauties shadowed forth in nature. In manual execution the one may be perfect, but the other alone possesses the true inspiration of art.

The history of art furnishes us with very numerous anecdotes of the power of exquisite imitation, or deception, both in ancient and modern artists. Parrhasius and Zeuxis, two celebrated Grecian painters who flourished in the fourth century before Christ, disputed as to which of them was the best painter in their age; and to decide this point they agreed that each should produce a picture of which the world should judge. Accordingly Zeuxis painted some grapes, and Parrhasius a curtain. The two works were finished and produced. When that of Zeuxis was exposed to view, birds came and pecked at it: proud of this testimony to the excellence of his performance, he desired Parrhasius to remove the veil and show his picture; but finding himself outwitted, candidly confessed himself overcome. Zeuxis afterwards painted a boy carrying grapes; and seeing the birds come to it, he admitted that if the grapes were well done, the boy would in proportion be ill done, since the birds were not afraid of him.

Apelles, a still more celebrated Grecian painter than either of those just mentioned, and who enjoyed the patronage of Alexander the Great, wishing to make the acquaintance of Protogenes, an artist who lived in the island of Rhodes, went thither to see him. When he arrived at the painter's house, he found only an old woman, who asking the visitor his name, he answered that he would write it on the canvass; and taking his pencil, with some colour he designed something with great delicacy, and then retired. Protogenes coming home shortly after, was told of what had passed. The beauty of the outline at once convinced him that it was the work of Apelles, as he believed that no one else could equal it. Then, with another colour he drew on the first lines a second outline, more correct and delicate, and went out, bidding the old woman show *that* to the person if he returned. When Apelles called again he was astonished to see himself outdone; but with a third colour he finished the design with all the subtility of his art. Protogenes returning, and seeing this last addition, gave up the dispute, and ran in haste to seek for Apelles. Pliny regarded the portrait of a horse, by this painter, so true that other horses neighed and kicked at it, as an achievement of art as admirable as Venus Anadyomene, which Fuseli calls "the wonder of art, the despair of artists." Another anecdote of this prince of Grecian painters is on record. He was once wrecked on the coast of Alexandria, where he had formerly been well received, but the then reigning Ptolemy treated him with neglect. The courtiers, who owed the artist a spite, sent him a fictitious invitation to the royal table, by one of their attendants, which he gladly accepted. The king, offended at his presumption, asked him which of his court had invited him. The painter extricated himself like a man of wit; taking a piece of charcoal from a chafing-dish which stood by, with three or four strokes on the wall, he sketched the portrait of the person who had brought him the invitation, to the great astonishment of the king, who instantly recognised the face of the impostor. This adventure reconciled Ptolemy to the painter, who was afterwards loaded with honours. An extraordinary tribute to the graphic power of Apelles' pencil is contained in the fact related by Appian, that a certain physiognomist and fortune-teller, by looking on his portraits, foretold the very time of the death of their originals, or at what time their deaths had happened, if they were already dead. This, however, may be fairly labelled "doubtful."

In feats of imitative art modern painters have not been inferior to the ancients. Barnazano, an excellent painter of landscapes, painted a strawberry so exactly that peacocks snapped at it, supposing it to be natural. Hans Holbein, a distinguished German artist of the fifteenth century, when about to leave Basil for a time, to raise the value of his works, which were growing too numerous there, resolved to leave behind him a specimen of his artistic abilities. A portrait of one of his patrons was at his house; on the forehead he painted a fly, and sent the picture to its owner; the gentleman, struck with the beauty of the piece, went eagerly to brush off the fly, and then found the deceit. The story soon spread, and, as such trifling deceptions often do, made more noise in the artist's favour than greater excellencies. Orders were given to prevent the city being deprived of so great a painter, but in the mean time Holbein had privately taken his departure.

As it was not unusual for some of the older masters to repeat their best pieces, the existence of two or three of the same subject is no argument against their genuineness. The value of these masterpieces of art has, it need not be remarked, too often led to attempts at copying them, some of which have deceived the most skilful judges. The following is, perhaps, the best instance of the fidelity and masterly execution of a copy. Frederick II., Duke of Mantua, passing through Florence on his way to Rome, paid a visit to the Medici palace; over one of the doors he saw the portrait of Pope Leo X., between those of Cardinal de Medici and Cardinal de Rossi; the heads were by Raphael, and the drapery by Julio Romano, and altogether it was an admirable painting. The duke was so greatly taken with the picture that he earnestly begged it of Pope Clement VII. when he reached Rome. His holiness at once acceded to the request of the duke, and ordered his secretary, Octavian de Medicis, to put the picture in a case and send it to Mantua. The secretary, who was a lover of painting, and loath to deprive Florence of such a treasure, deferred sending it, pretending that the frame was not rich enough, and that he would get another fitted up for it; this delay gave him time to have it copied by Andrea del Sarto, who imitated even the minutest effects which time and exposure had made on it. The copy was so perfect that Octavian could hardly distinguish it from the original; and, that he might not be deceived, he put a private mark on the back, and sent it to Mantua. The duke received it with great satisfaction, not doubting that it was the genuine work of Raphael and Julio Romano; the latter was then in the service of Frederick, and had no suspicion of its being a copy; but Vasari, who had seen it whilst painting, going to Mantua, disabused him. Having been shown all the duke's rarities by Romano, the latter said that the finest still remained to be seen, naming the painting by Raphael and himself. Vasari said it was very fine, but that it was not Raphael's. "Not Raphael's!" said the astonished artist, "do I not know my own work, do I not see the strokes of my pencil?" Vasari answered, "You do not observe it closely enough; I saw Andrea del Sarto draw that very picture, and you will see behind a mark, to distinguish it from the original." Finding this to be true, the deceived painter replied, "I value it as much as if it was Raphael's, and am even more pleased, for it is very surprising to see so excellent a master so well imitated."

Sebastian Ricci executed several very excellent imitations of Paul Veronese, many of which he sold for originals, and once deceived La Fosse. When the latter was convinced of the imposition, he advised Sebastian, "for the future to paint nothing but Paul Veroneses, and no more Riccis."

One other instance of deception will sufficiently illustrate how successfully it has been practised in works of art. There is a collection of engravings by Bernard Picart, an ingenious artist of the last century, which has been published under the title of *The Innocent Impostures*. Picart had been long vexed at the taste of the day, which made it fashionable to decry the works, and depreciate the talents, of the engravers at that time, in comparison with the earlier artists. To expose the absurdity of such an opinion, Picart chose some designs of the earlier painters, which had not been engraved, worked at them in secret, stamped some of them on old paper, and had them quietly circulated. In every case they were received by the *cognoscenti* as genuine works of the old engravers. Having had his joke, he exposed the trick, and published the collection under the title just mentioned.

The annals of art abound with almost equally numerous instances of popular credulity respecting individual pieces. An account of one of those will conclude this paper. In his *Lives* of the Spanish Painters, Mr. Cumberland mentions a singular instance of this in connexion with a picture of the Immaculate Conception, by Juanes, and which was in the late College of Jesuits in Valencia. This celebrated picture is the object of universal veneration amongst the faithful, and by the devout and credulous is considered almost equal to the Virgin herself; for tradition reports, that it was painted by order of Father Martin Alberto, to whom the Blessed Virgin condescended to appear on the eve of the Assumption, and required of the holy father to have her portrait taken in the dress she then wore. The honourable office of fulfilling the command was committed to Juanes. For a long time the artist failed in transferring the sacred features to the canvass, but at length succeeded; and by means of elaborate acts of penance and great contrition, the work was sanctified and the pencil never missed its stroke. The popular tradition goes on to say, that Juanes being one day seated on a scaffold, giving his finishing touches to the upper part of the picture, the woodwork gave way, and the painter being in the act of falling, the holy personage, whose portrait he had taken, stepped opportunely from the canvass, and, seizing his hand, saved him from the fall; this done, and Juanes safely landed on the floor, the gracious lady returned to her frame.

SARDIS.

History furnishes few more striking illustrations of the transience of man's most valuable possessions, and his greatest works, than Sardis. The vicissitudes which it has undergone, the remembrance of its ancient magnificence, the story of its decline, and the mournful prospect of its present desolation, form a sadly eloquent commentary upon the mutability of human affairs. When Dr. Chandler visited it in the latter part of the last century, the site of the once proud capital of Lydia, the Christian Sardis of the Apocalypse, was "green and flowery;" and the residence of a long line of wealthy and powerful monarchs was, as it is now, the habitation of oxen and buffaloes, with the exception of a few mud huts which sheltered Turkish herdsmen. "Identified with the names of Crœsus, and Cyrus, and Alexander," says a later traveller, "and covering the plain with her thousands of inhabitants, and tens of thousands of men of war; great even in the days of Augustus; ruined by earthquakes, and restored to its importance by the munificence of Tiberius; Christian Sardis offering her hymns of thanksgiving for deliverance from pagan persecution in the magnificent temples of the virgin and the apostles; Sardis again fallen under the yoke of a false religion, but still retaining her numerous population and powerful defence only five hundred years ago:—What is Sardis now?" Her greatness and her glory have passed away, and "like an unsubstantial pageant faded," realising the desolation expressed in the beautiful verses of the Persian poet:—

> "The spider has wove his web in the imperial palace,
> And the owl hath sung her watch-song on the towers of Afrasiab."

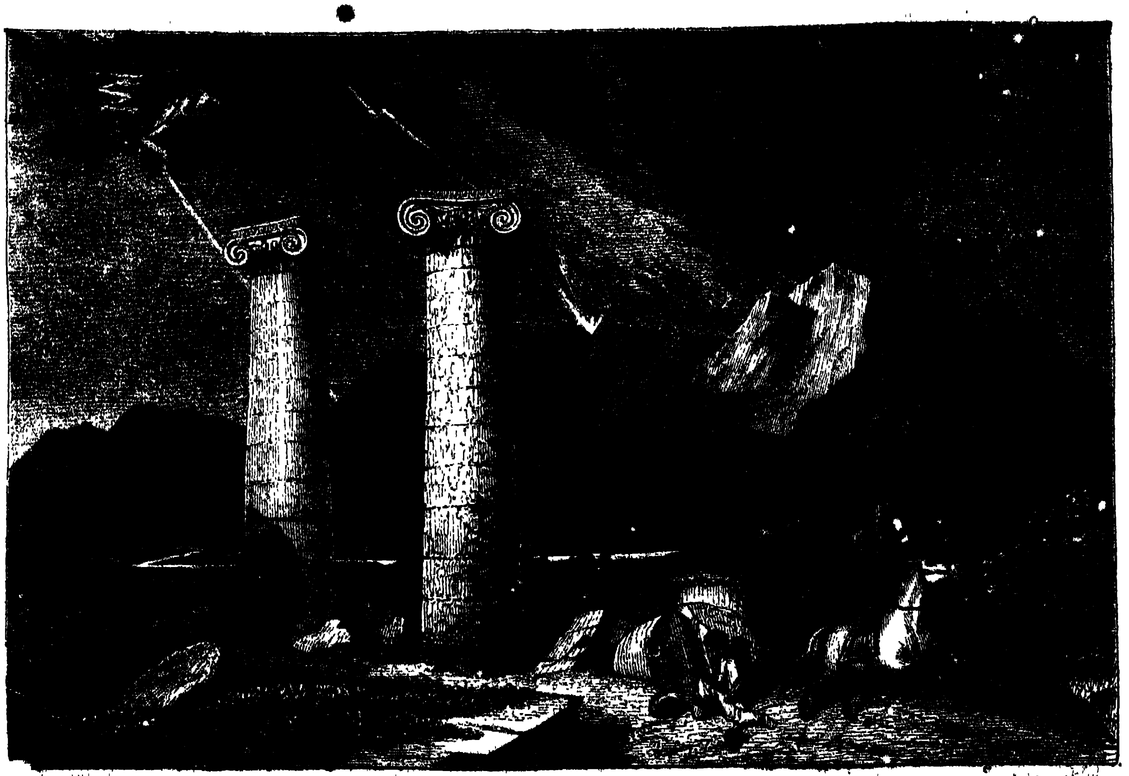
The ancient kingdom of Lydia, celebrated in history and poetry for its power and civilisation, and for the splendour of its capital, embraced, as most of our readers are aware, a small but delightful district at the back of the Ionic settlements, verging towards the interior of Asia Minor. At its most prosperous era, it extended from the river Halys on the east to the Ægean sea on the west, and from the northern shores of the blue Mediterranean to the southern coast of the Euxine. The wealth of its monarchs is alike the subject of history and song; and the site of their capital, even in its present state, has preserved traces of their enterprise and their splendour. Anacreon celebrates the "famed Gyges' treasures," which were afterwards surpassed by the riches of Crœsus. Herodotus describes the stupendous monument which this latter prince erected to the memory of his father, Alyattes, and which, after the lapse of twenty-four centuries, yet remains in sufficient entirety to justify the admiration he expresses. The history of this once powerful kingdom is marked by a succession of changes which has few, if any, parallels in the annals of any other nation. Conquered by Cyrus, Xerxes, and Alexander, submitting to Roman dominion and now groaning under the grinding despotism of the Turks, a waste and almost depopulated province, the eye of the traveller beholds in the ruins which he everywhere meets with the saddening memorials of its many vicissitudes. Sardis was situated between the river Cayster to the south, and the Hermus to the north, on the banks of the Pactolus, at the foot of Mount Imolus. The date of its foundation cannot be fixed; Strabo represents it as very ancient, but "posterior to the siege of Troy" (1184 B.C.). After its capture by Cyrus, it retained its size and importance, and became the seat of the Persian satraps, as it had been of the Lydian kings. Nearly a century later it was taken by Alexander the Great, after whose death it became the residence of Achæus, the governor, under the Syrian kings, of the whole Asiatic peninsula. Subsequently it passed under the dominion of the all-conquering Romans, and sank into a place of inferior importance, its principal trade being transferred to Smyrna and Ephesus. In the reign of Tiberius, it, with eleven other of the principal cities of Lower Asia, was almost totally destroyed by an earthquake, but was restored by the munificence of the emperor; its inhabitants were exempted from all taxes for five years, and received a supply of 100,000 great sesterces. "The calamity," says Tacitus, "in recording this event, "happened in the night, and was for that reason the more disastrous; no warning given, and, by consequence, no time, to escape. Hills are said to have sunk, and valleys rose to mountains. . Quick flashes of lightning showed all the horrors of the scene."

At what period, or by whom, Christianity was introduced into Sardis is unknown. Some have said that the new faith was first preached there by the apostle John, whilst others ascribe this to Clement, a disciple of St. Paul. Of its Christian history during the three following centuries we know but little, beyond that during the second it was under the Government of Melito, a learned and eloquent bishop, who suffered greatly from the persecutions of Marcus, who, in the language of Gibbon, "despised the Christians as a philosopher, and punished them as a sovereign." During the r[illegible] Julian the Apostate, in the fourth century, an attempt wa[illegible]de by the old idolatry to recover its former ascendancy in Sardis; and, to further this object, Chrysanthius, a native of the city, was appointed by the emperor governor of Lydia. The heathen worship was practically restored; the altars which had been destroyed were rebuilt; the temples were raised from their ruins, and the city of Crœsus once more resounded with the pagan hymns of Cybele and Apollo. These efforts, however, ended with the brief reign of their author; after his death the heathen priesthood was again suppressed, and the institutions of Christianity once more and permanently established. In the year 400 A.D., Sardis was taken by the Goths, under Tribigild and Caianas, who had revolted from the [illegible] Arcadias; the city was plundered, and many of its inhabitants were put to the sword. Of its history since then little remains to be said: in the wars of the Greek emperors with the Paulicians, it suffered greatly, and the subsequent calamities of Asia fell heavily upon it, till it at length passed under the desolating yoke of the Turks in 1304. The final banishment of Christianity from it was effected about forty years ago by the tyranny of a Turkish chieftain, Kar'Osman Oglou, to whom Byron refers in his *Bride of Abydos*:—

> "A nobler and a braver man
> Was never seen in battle's van,
> We Moslems reck not much of blood
> But yet the line of Karasman
> Unchanged, unchangeable hath stood
> First of the bold Timariot bands
> That won and well can keep their lands.
> ——— Enough that he who comes to woo
> Is kinsman to the Bey Oglou!"

A few Christians, who resided in the place, wished to erect a church, to enable them to worship in a spot hallowed by the early triumphs of their faith, but the savage Bey refused the permission, and the persecuted few were obliged to forsake their ancient home, and retire beyond his jurisdiction.

Such is a brief outline of the history and the fate of Sardis. "How doth the city sit solitary that was full of people! Her foundations are fallen, her walls are thrown down. She sits silent in darkness, and is no longer called the lady of kingdoms." The miserable village of Sart furnishes the only traces of human habitation now near its site: the place of its once gorgeous palaces and majestic temples is marked only by scattered heaps of ruins. Our engraving, taken from the drawing of a traveller, shows all that remains of its former glory. The two lonely pillars which stand amid the scattered fragments in the foreground are supposed to be the remains of the temple of Cybele. In Dr. Chandler's time, there were five of these columns standing; but the Turks have since mutilated the ruin, in the expectation of finding concealed treasure." Behind runs the Pactolus, and beyond it, in the background, the Imolus rears its jagged and grotesque summits as in the days of Crœsus, Cyrus, and Alexander. The princes, warriors, temples, and churches of Sardis have now passed away, and the owl and jackal occupy their place; whilst the black tent of the Turcoman is pitched upon the plain through which Xerxes poured his armed millions to fall beneath the sword of the Greeks. Of the structures which once echoed with the pæans of heathenism and the hosannas of our own victorious faith, nothing now remains to meet the eye of the traveller, but a few broken and scattered fragments of marble: the only relics of the ancient days which have outlived the ravages of time and war, are the colossal monuments of death which cover the last resting-place of the Lydian kings.



RUINS OF SARDIS.

HASTINGS.

Hastings is one of the few places in England which combines present attractions with richness in historical associations. There is no spot in the kingdom which can boast connexion with an event of such stupendous importance in the annals of the English nation, as the battle which was fought in the heights over the town. To it we owe some of the most curious, and it may be the most useful, features in our laws and government. It wrought a great change in the manners, tastes, and mode of thought of the whole people. From it we have derived our *hauts seigneurs*, our House of Lords, and the whole pile of feudalism which has for centuries weighed upon the energies of the nation. The principles which brought Charles I. to the scaffold struck root in the battle-field at Hastings, and monopoly, many abuses, and barbarism, which still linger in our path, may have their origin traced directly or indirectly to the same disastrous field.

VIEW OF HASTINGS.

Most of our readers are doubtless already acquainted with the circumstances which led to it.

The name of the town is derived from that of Hastings, a Danish chieftain, who in the time of Alfred the Great ravaged the southern coasts of England. After various exploits in which he displayed great valour and ferocity, he was defeated by Alfred, and finally driven from the country. During his stay he had [illegible] up intrenchments on the coast, from which circumstance the place took his name.

Harold, the son of Godwin, when a young prince, was ship-wrecked on the coast of Normandy, and conducted to the court of Duke William, by whom he was for a long time detained under pretence of entertaining him and showing him the country. During the heat and excitement of a banquet, a promise was extracted from him that on the death of Edward the Confessor, the reigning king of

England, he would assist William in gaining the throne, and renounce all his own rights in his favour. Shortly afterwards the duke "convoked a great council of the lords and barons of Normandy, in the town of Bayeux. The day before that fixed for the ceremony, he had caused to be brought from all the places round bones and relics of the saints, sufficient to fill a great chest or cask, which was placed in the hall of council, and covered with cloth of gold. When the duke had taken his seat in the chair of state, holding a drawn sword in his hand, crowned with a circlet of gems, and surrounded by the crowd of Norman chiefs, amongst whom was the Saxon Harold, two little caskets of relics were brought and laid upon the cask of relics. William then said, 'Harold, I require thee, before this noble assembly, to confirm the promise thou hast made me; namely, to assist me in obtaining the kingdom of England after King Edward's death, to marry my daughter Adela, and to send me thy sister, that I may give her to one of my followers.' The Englishman, once more taken by surprise (for he had previously been entrapped, as the only means of escaping a long and wearisome captivity, into making some vague promises of adhesion to William's cause), and not daring to deny his own words, approached the two reliquaries with a troubled air, laid his hand upon them, and swore to execute to the utmost of his power his agreement with the duke, if he lived and with God's help. The whole assembly repeated, 'May God be thy help.' William immediately made a sign, on which the cloth of gold was removed, and discovered the bones and skeletons which filled the cask to the brim, and upon which the son of Godwin had sworn without knowing it. The Norman historians say that he shuddered, and that his countenance turned pale at the sight of this enormous heap."[*] Harold soon after came to the throne of England himself, and immediately after his accession received the following message from William. "William, duke of the Normans, sends to remind thee of the oath which thou hast sworn to him with thy mouth, and with thy hand upon good and holy relics." "It is true," replied the king, "that I took the oath to William, but I took it under constraint. I promised what did not belong to me, a promise which I could not in any way perform. My royal authority is not my own; I could not lay it down against the will of the country, nor can I against the will of the country take a foreign wife. As for my sister, whom the duke claims that he may marry her to one of his chiefs, she has died within the year; would he have me send her corpse?"

In truth, he was placed in a puzzling dilemma. His own interests and those of his people were to be weighed against an oath taken with every circumstance of solemnity, which in that age could add weight to obligations. Either alternative was a deplorable one, and at this distance of time we must not judge him harshly. Had his crime been ten thousand times as great, his unshaken courage and heroic death would well have expiated it, and without laying claim to any skill in deciding cases of conscience, we dare affirm that the course he followed was the one best pleasing in the eyes of Him who judges men not by their words merely but by their motives.

William immediately made preparations for an invasion. From all parts of Normandy, the needy, the vicious, the outlawed, the indebted, the adventurous, all whom no ties of duty or religion could bind, who left nothing behind them but bad repute, and had nothing to lose by their lives, and hoped for rich plunder if successful, flocked to his standard. The expedition sailed from St. Valery, near Dieppe, on the morning of the 20th of December, 1066. William led the van in a vessel which had been presented to him by his wife Matilda, which was distinguished by its splendid decorations in the day, and in the darkness of the night by a brilliant light at its mast-head. Being of better construction, and less heavily laden than the others, it soon outstripped all the rest, and during the night got out of sight of them. Early in the morning a sailor was sent to the mast-head to look out for them, and saw nought but sky and water. On going up a second time, he saw four sails; and a little after, reported the sea to be covered with a forest of masts. They cast anchor a few hours afterwards on the Sussex coast, and landed between Pevensey and Hastings. Tradition still points out the precise spot. The knights and archers were the first to disembark, and then came the carpenters, armourers, masons, with their tools in their hands, planes, saws, axes, &c. Last of all came the duke, who stumbled and fell as he jumped on shore. Those around turned pale, looking upon it as a bad omen; but William jumped up quickly, with his hands full of sand, and dissipated their fears by exclaiming, "By the splendour of God" (his favourite oath), "I have seized England with my two hands, and that which I have grasped with your help I will maintain!" They dined on the beach, and then proceeded to the erection of a wooden fortress which they had brought from Normandy in disjointed pieces, but ready to be fitted together. In this they supped merrily that night. An English knight had, from a neighbouring hill, beheld the landing of this mighty host, and forthwith rode, without tarrying by the way, to convey the news to Harold, who was in the north, near York, where he had just defeated a horde of Norwegians and slain their king. "The Normans have come," said he, rushing into his presence, "and have landed at Hastings, and built up a fort, which they have enclosed with a foss and palisades; and they will rend the land from thee and thine, unless thou defend it well." Harold forthwith set out upon his march southward, calling upon thanes and serfs and freemen, as he passed along, to join him in defending England from the scum of Normandy.

In the mean time William had moved on to Hastings, and encamped on the East Hill, where some remains of his intrenchments still exist. It is in allusion to this event that Campbell's beautiful lines were composed on the Camp Hill:—

"In the deep blue of eve,
 Ere the twinkling of stars had begun,
Or the lark took his leave
 Of the stars and the sweet setting sun,
I climb'd to yon heights,
 Where the Norman encamp'd him of old,
With his bowmen and knights,
 And his banner all burnish'd with gold.

At the Conqueror's side,
 There his minstrelsy sat, harp in hand;
In pavilion wide,
 And they chanted the deeds of Roland.
Still the ramparted ground
 With a vision my fancy inspires;
And I hear the trump sound,
 As it marshall'd our chivalry's sires.

On each side of that mead
 Stood the captors of England's domains,
That ennobled her breed,
 And high mettled the blood of her veins.
Over hauberk and helm,
 As the sun's setting splendour was thrown,
Thence they look'd o'er a realm,
 And to-morrow beheld it their own."

The next day the battle took place; and long and valiantly did the Saxons repulse with bill and bow the charges of the Norman chivalry, striking home for "Harold and Holy Crosse!" The King was at last struck down by a well-aimed arrow. His sons had already fallen fighting by his side, and the English, "few and faint, but fearless still," were overwhelmed and routed. In the evening—to use the expressive phrase of the Saxon chronicler—"the high men of the land were Normans, and the low men were Saxons."

The Conqueror built an abbey on the field, and called it Battle Abbey, the ruins of which still remain.

Amongst the antiquities of Hastings, the ruins of the old Castle, of which we give an engraving, holds a prominent place. It crowns the West Hill, and is still a very striking and picturesque object. Little is known of its early origin. It is supposed, and not without foundation, that there was a fort of some sort here before the Norman conquest; as it is stated in an old chronicle, that Hastings, amongst other places, was fortified by a British chief, named Arviragus, when he threw off the Roman yoke. During the greater part of the last century, the area within the castle walls was used as a pasture for sheep, and nothing of the castle itself remained but a few misshapen ruins. In the year 1834, however, the Earl of Chichester caused excavations to be set on foot.

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[*] Thierry's "Norman Conquest."

The lower part of a large gate, supposed to have been the gate of the keep, was soon discovered. The gateway was about eight or nine feet wide, and nineteen feet deep. The groove for the portcullis and the hinges were still remaining, and a piece of chain, which had doubtless been used in fastening it, was found near the spot. The remains of the castle at present have the shape of a rounded triangle, with the base towards the south, on which side there was never any necessity for outworks or other defences, as it stands on the summit of a craggy and precipitous rock, two or three hundred feet in height. On the eastern side is a wall flanked by towers, part of which is still standing, and on the remaining side a deep ditch separating the hill on which the castle stands, from that which rises beside it. Near the north gate was a guard-house, and the ruins of a church 110 feet in length are also close by. From the mouldings which remain, it appears to have been in different styles of architecture. An arch which is now standing, was restored by Lord Chichester. There are also some remains of the Chapter House and the Prebendal Hall. During the excavations in this quarter, some coffins were found, two of which contained skeletons in a state of perfect preservation. From the north gate the fortifications continue in a lofty wall, supported by towers which are still standing, and of considerable height. One of them is circular, and contains a flight of stone steps; the other has the remains of Norman windows deeply splayed in the interior. The walls are generally massive, some parts being built of lime and rubble, which seems to indicate a Roman origin; but the greater part is undoubtedly Norman work of an earlier period.

Several relics of antiquity dug up in the ruins are preserved in the lodge at the entrance, amongst which are a Norman spur, ancient keys, half of a Norman bridle-bit, a Saxon lamp-suspender, a Roman chain bridle, &c. The area of the castle is now laid out in lawns and flower-borders, but, in accordance with the time-honoured and peculiarly English fondness for "bucksheesh," it cannot be seen without paying for it.

In the distribution of the spoils of the vanquished, after the battle of Hastings, the castle, which is supposed to have been repaired by William, was given, with the Rape* of Hastings, to Robert, Earl of Eu, by one of whose descendants it was forfeited to the crown in the reign of Henry III. In it William Rufus, with his nobles, who had been summoned to do him homage prior to his departure, was detained more than a month by contrary winds.

Humphrey de Tilleul had the command of the castle till 1069, when William the Conqueror, being engaged in the subjugation of the north, his vassal abandoned his post, and with many of his friends returned to Normandy, preferring the quiet of their homes to the precarious possession of lands and honours in a foreign country. William was so incensed at this, that he forfeited Tilleul's estates, and could never be persuaded to restore them to his heirs. After passing through various hands, the lordship and castle were sold, in the reign of Elizabeth, by the Earl of Huntingdon, to Sir Thomas Pelham, for £2,500. From the latter it has descended to the present owner, the Earl of Chichester.

The legends relating to the castle are numerous. It is said that in the reign of Henry VIII. an incident occurred somewhat like, but more tragical than the adventure of Rebecca, the fair Jewess, with the amorous knight, Brian de Bois-Guilbert. The monarch, it is said, was staying at the castle, and was urging his unlawful suit with even more than his usual ardour, upon a lady who was there likewise. To escape from his importunity and displeasure, both alike terrible, she threw herself headlong from the northern turret, and was dashed to pieces on the beach below.

The account which has been handed down, relative to the destruction of the castle is horrible, if true. One of its possessors, during the reign of Henry, was Edgar, a jealous earl, and a great favourite with the king. He had married one of the ladies of the court, an amiable and handsome woman whom he ardently loved, but it was love without confidence, and he at last came to the conclusion that it was not returned, and "green-eyed jealousy" instantly took possession of him. He watched every movement of his bride with untiring vigilance, and at last began to place restraints upon her liberty. The unfortunate lady appealed to the king, who ordered him to supply her with money, and place apartments in the castle at her sole disposal during her lifetime. The earl obeyed with reluctance, but resolved to observe her movements more closely than ever; and, on entering her room suddenly one day, he found her giving orders to her falconer. Transported with rage he killed the man on the spot, and gave his wife into the custody of his guard, and ordered a fire to be prepared in the court-yard to burn her and her child alive. The trembling retainers obeyed with reluctance. The unfortunate lady, after a few moments of heartrending prayer and entreaty, appeared to be resigned to her fate, and occupied herself in making trifling presents to her servants, and putting her affairs in order, until the pile was ready. Tied to the stake, the fire was applied to the logs, and the wind blowing high, the flames shot up with fury. The shrieks of the hapless woman pierced the hearts of every one present, but made no impression upon the earl, who stood by with folded arms and a smile of hate playing on his lips. His crime, however, had not reached its consummation when the alarm was given that the castle was on fire, and notwithstanding all the exertions made to save it, in a few hours nothing remained of the noble edifice but blackened walls and smouldering rafters. Remorse seemed to have seized upon Edgar. He ordered the ashes of his wife and child to be collected and placed in a stone coffin, and then quitted the country. He was never heard of more. The castle from that time mouldered away, and the merry laughter of children, and popping of champagne bottles at picnic parties are now the only sounds which are heard, where the war-horse once neighed, and the "warder's silver trump" resounded along hall, and court, and bastion.

The recognised salubrity and mildness of the air, together with the openness of the coast and smoothness of the beach, have long made Hastings a favourite and a recommended resort. The shore is not abrupt, and the water almost always limpid, and of that beautiful sea-green hue so inviting to bathers. The constant surging of the waves, first breaking against the reefs and next dashing over the sloping shingle, is not unwelcome music at midnight to the ears of all who *sleep* in the vicinity of the shore. Sir James Clark states that in winter Hastings is most desirable as a place of residence during January and February. "During the spring also it has the advantage of being more effectually sheltered from north and north-east winds than any other place frequented by invalids on the coast of Sussex. It is also comparatively little subject to fogs in the spring, and the fall of rain may be said at that time to be less than on other portions of the coast. As might be expected from the low and sheltered situation of Hastings, it will be found a favourable residence generally to invalids suffering under diseases of the chest. Delicate persons, who desire to avoid exposure to the north-east winds, may pass the cold season here with advantage. Owing to the close manner in which this place is hemmed in on the sea by steep and high cliffs, it has an atmosphere more completely marine than almost any other part of this coast, with the exception, of course, of St. Leonard's, which possesses the same dry and absorbent soil." The breadth and extent of its esplanade, also, and the protection afforded by the colonnades for walking exercise, are circumstances of considerable importance to the invalid, and render a conjoined residence at Hastings and St. Leonard's a very efficient substitute for a trip to Madeira.

Whilst in the neighbourhood, it should not be forgotten that a delightful excursion may be made to Battle Abbey, not more than six miles distant. The grounds are now in the possession of the Webster family, who have liberally thrown them open to public inspection every Monday. It is here that the "Battel Roll," a sort of primitive "Court Guide," is carefully preserved, and furnishes a list valuable to the antiquary and historian of those families who came over with William the Conqueror.

Hastings is a pretty, though old-fashioned town. A new suburb, called St. Leonard's, has recently sprung up, which adds greatly to the beauty of the neighbourhood. It is a sort of west-end, or fashionable quarter. The buildings are all very fine, and the air of quiet repose which pervades it, makes it now a favourite resort of invalids. Numerous country-seats belonging to the gentry of the neighbourhood are to be met with on every side, but there is nothing which gives such a charm to the landscape as the sea and sea-shore. Nowhere is the sea so glorious as at Hastings:—

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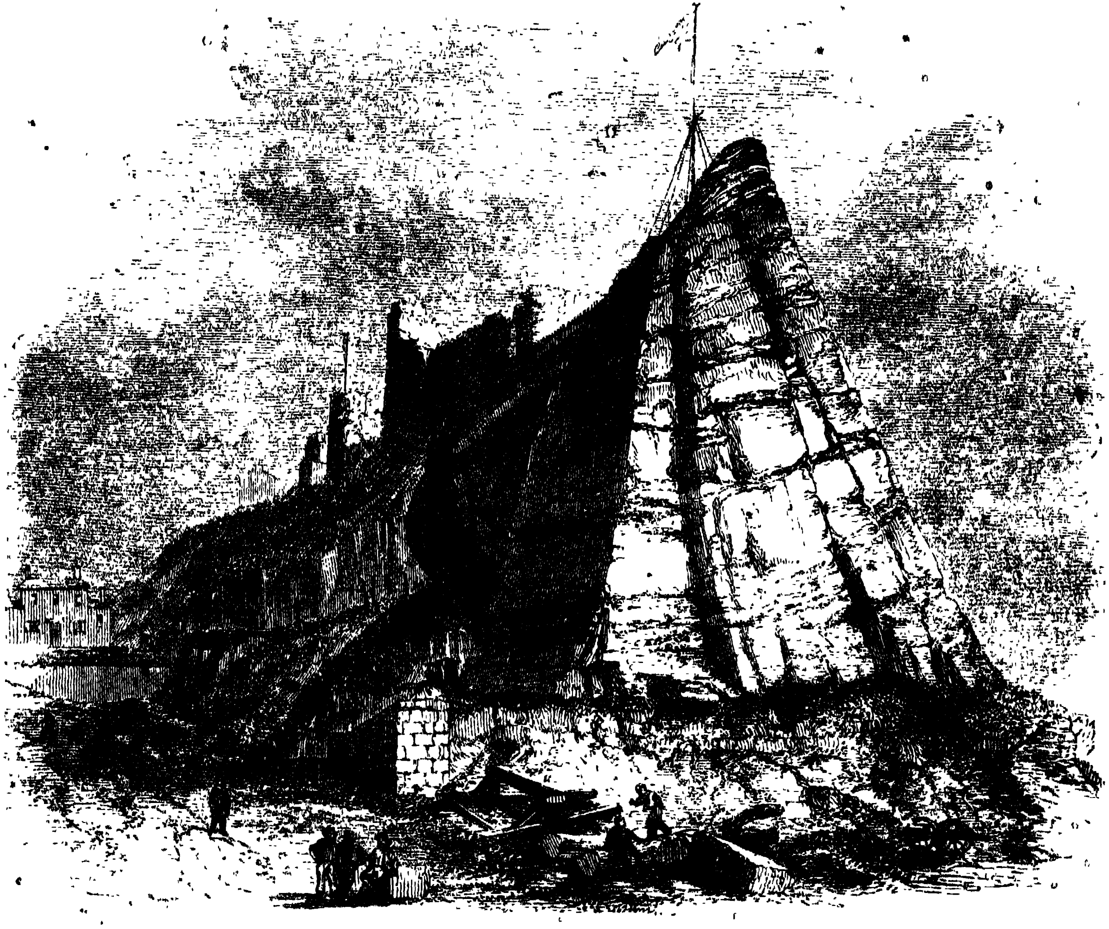
* Rape is a corruption of the Latin *ripa*, a bank or shore, and is a term peculiar to Sussex.

"The broad bosom of the ocean keeps
An equal motion, swelling as it sleeps,
Then slowly sinking, curling to the strand,
Faint lazy waves o'ercreep the ridgy sand,
Or tap the tarry boat with gentle blow,
And back return in silence, smooth and slow.
Ships in the calm seem anchor'd, for they glide
On the still sea, urged solely by the tide."

For beauty of scenery, salubrity of air, for all in short that can delight the eye, and invigorate the frame, Hastings stands without a rival amongst the watering places of England, and to all those who long to escape from the heat and dust and smoke of towns during the summer months, no better retreat can offer itself.



RUINS OF HASTINGS CASTLE.

BUTTERFLIES AND MOTHS.

When Valeria visits Virgilia, during the absence of Coriolanus, she inquires—"How does your little son," and, on receiving a reply, proceeds in a strain grateful to a mother's heart:—"O' my word, the father's son; I'll swear 'tis a very pretty boy. O' my troth, I looked upon him on Wednesday half an hour together. "I saw him run after a gilded butterfly; and when he caught him, he let it go again; and after it again, and over and over he comes, and up again." And how many of us have engaged in the same childish gambol: eagerly chasing the gorgeous insect, with bare head, and locks blown about by the wind, then nearing the object of pursuit, throwing down the cap on the grass exulting in its capture, and raising it gently only to find the butterfly was gone, or should it happen to be there—the chance of which may be one in a thousand—hastily seizing it to the injury of its beauty, or finding that by one vigorous dart it had escaped from durance, and again was free.

The poet of the Seasons invites our attention to this insect in after-life, as he says,—

"Behold! ye pilgrims of this earth, behold!
See all, but man, with unearn'd pleasure gay:
See her bright robes the butterfly unfold,
Broke from her wintry tomb in time of May
What youthful bride can equal her array?
Who can, with her, for easy pleasure vie?
From mead to mead, with gentle wing to stray,
From flower to flower on balmy gales to fly,
Is all she hath to do beneath the radiant sky."

But not only do these insects fly "from mead to mead;" for, universally diffused as they are, in the flower-garden, they flit from blossom to blossom; on the mountains they dart forth, as we rustle through the heather; and in the forest they attract attention, glancing through its bright and sunny glades, or motionless as the lichens which variegate the trunks of its wide-spreading trees. Nor do they merely delight themselves in the open air: the butterfly will pass from the garden to the dwelling, and invite the capture of the young entomologist, as it settles on some piece of furniture in an inner room. Its tribes are adapted to every season, while their range is so varied and extensive. Some appear with the primroses of spring; others in summer, with "the queen of flowers;" others with the rich and greatly diversified dahlias of autumn; and He who sustains and defends the snowdrop amidst cold and storm, enables one, at least, to sport about the chrysanthemums of winter.

And then, what a lovely, splendid, and gorgeous race they are

Not only are they conspicuous, but transcendant, among the creatures of whom it is said,—

"Lo! the bright train their radiant wings unfold,
With silver fringed, and freckled o'er with gold.
What atom forms of insect life appear!
And who can follow Nature's pencil there?
Their wings with azure, green, and purple gloss'd,
Studded with colour'd eyes, with gems emboss'd,
Inlaid with pearl, and mark'd with various stains,
Of lively crimson through their dusky veins."

Some exhibit gorgeous metallic hues; and others tints of different kinds rarely equalled, and not to be surpassed in the wide range of Nature. Nor are the markings of their wings and bodies less varied or less attractive. Lines, dots, circles, triangles, parallelograms, may there be observed, mingled with forms of endless diversity, defying all the terms of the mathematician, yet all traced and coloured by a pencil, which the painter, however gifted, will strive in vain to imitate. No wonder that Moore should exclaim,—

"And they, before whose sleepy eyes,
In their own bright Kathain bowers,
Sparkle such rainbow butterflies;
That they might fancy the rich flowers
That round them in the sun lay sighing,
Had been by magic all set flying"

The artist has depicted, in our engraving, some of these exquisite forms, and what they want in gaiety and splendour of hue must now be added, so far as it can be, in words—so that our readers may paint them for themselves—recalling, as the group does, the poetic description:—

"On the gay bosom of some fragrant flower,
They, idly fluttering, live their little hour;
Their life all pleasure, and their task all play,
All Spring their age, and sunshine all their day."

At the top of the engraving, on the left hand, is the Small Tortoiseshell Butterfly (*Vanessa urticæ*). It is abundant not only in England, but the adjoining continent, and is conspicuous for its beauty, and the lightness with which it flits from flower to flower. One brood appears in spring and another in autumn. It closely resembles, except in size, the Great Tortoiseshell Butterfly, which usually appears about the middle of July. It is rapid on the wing, often settling on dry pathways and the trunks of trees, delighting itself in the fervid rays of the sun. The colour of the wings above is dark orange-red, with a narrow vandyked edging of blue and a second of black; but its whole surface is beautifully and variously adorned.

Just beneath is the Fritillary of elegant form. The Fritillaries, for there is more than one kind, are among the most beautiful and the most common of their race; being met with in most parts of England—in woods and meadows, heaths and downs, during the months of June and July. Nature has been said, in allusion to the wings of butterflies, to have painted her canvas on both sides. The upper one is often more delicately pencilled than the lower, but it is not so with the Fritillaries. Their upper surface is reddish-brown and black, disposed in angular streaks or chequers, but the reverse of their richly scalloped wings is abundantly and richly adorned. Let, then, the reader look out for one of these beautiful creatures while it is visible; often may it be observed in the garden,

"Where, he arriving, round about doth flie
From bed to bed, from one to t'other border,
And takes survey with curious busy eye,
Of every flower and herbe there set in order;
Now this, now that, he tasteth tenderly,
Yet none of these he rudely doth disorder,
Ne with his feete their silken leaves deface,
But pastures on the pleasures of each place."

The next insect a little below the last mentioned, and towards the centre of the page, is the Cabbage-butterfly (*Pontia brassicæ*). It appears in April and May; the wings are white above, with a large patch of black on the tip of the anterior pair. The under surface of the wings inclines to yellow, the lower being finely powdered with black; the upper wings have two conspicuous black spots.

Returning to the outer line, we observe the Peacock's Eye (*Vanessa Io*), the colour of which is deep brownish-red, inclining to purple, with a large eye-like spot on each wing above; beneath, the wings are dark, shining brown, traversed by fine undulating lines of black. In the south and midland counties of England, this beautiful species is very common, but it is more rare in the north, and seldom seen in Scotland. It usually appears in July, flitting about the hedgerows, along shaded lanes, and about the borders of copses, alighting every now and then to sun its wings, and again starting off on its aerial flight.

Now comes the Red Admiral (*Vanessa Atalanta*), with its velvet-black wings, broadly banded with red, and relieved by white and blue. In all parts of our island it is very common, as well as over Europe; it is found in the districts of Africa bordering the Mediterranean, and in the United States of America. It seldom appears until late in September, with its plumage singularly fresh and perfect. In some years these butterflies abound, and then twenty of these beautiful creatures may be seen, expanding and closing their brilliant wings under the fruit-trees on our walls, or basking on the disc of some autumnal flower.

The butterflies now described, are succeeded by two specimens of British moths. The beauty and delicacy of their plumage, its fulness, and the marbled arrangement and blending of varied tints of grey, brown, black, and yellow, render the moths of our island not less attractive than the more gaily painted butterflies that flit about in the bright sunbeams of summer. In general, they are nocturnal in their habits; but a few, consisting of the Sphinxes, or Hawk-moths—of which the one on the right is a specimen—pass, in broad day, from flower to flower in quest of their honeyed food. Their progress through the air resembles that of the hawk—hence their name; but, as they buzz round a flower with their wings vibrating so rapidly as to be scarcely discernible, they strongly resemble the humming-birds. The larger figure is that of the Red Underwing, its name describing that part of the insect, except that it is fringed and marked with black.

Other butterflies are seen; among which two only can now be noticed. The Swallow-tailed Butterfly (*Papilio Machaon*), the largest of our indigenous butterflies—with its wings adorned with black, powdered with yellow, and relieved by bold yellow markings, will not fail to be observed. From the posterior margin of the hinder wings projects an acute slip, resembling the outer tail-feathers of the swallow (to which its name is owing), and at each inner corner is a spot of red, with an anterior crescent of light blue; the whole nearly surrounded by a ring of black. Above this, is the Purple Emperor, or Highflier (*Apatura iris*). Its general colour above is dark brown, changing in certain lights into rich purplish blue of metallic lustre, and relieved by marks of white. This splendid butterfly appears only in the oak-woods of the more southern counties of our island, and that not in abundance. It is seldom seen before the month of July, and may then be observed during the middle of the day, soaring on rapid wings high over the summits of the tallest oaks. It has been denominated "the purple emperor" of these trees, and pre-eminently verifies the words of Wordsworth:—

——— "Before your sight,
Mounts on the breeze the butterfly, and soars,
Small creature as it is, from earth's bright flowers
Into the dewy clouds."

Art has often had to do with these lovely creatures. Psyche means in Greek, the human soul; and it means also a butterfly; of which apparently double sense, the reason is that a butterfly was a very ancient symbol of the soul. From the prevalence of this symbol, and the consequent coincidence of the names, the Greek sculptors frequently represented Psyche as subject to Cupid, in the shape of a butterfly. For this reason it is, that when she appears in their works under the human form, it is decorated with the light and filmy wings of that gay insect.

Shakspeare gathers from it also an image for a class of persons, to be observed, unhappily, in every age: Lear, when "fourscore and upwards," thus pathetically addresses Cordelia:—

COLLECTION OF BUTTERFLIES. DRAWN BY FREEMAN.

——— "Come, let's away to prison:
We two alone will sing like birds i' the cage:
When thou dost ask me blessing, I'll kneel down,
And ask of thee forgiveness: So we'll live,
And pray, and sing, and tell old tales, and laugh
At gilded butterflies, and hear poor rogues
Talk of court news; and we'll talk with them too,—
Who loses, and who wins; who's in, who's out;—
And take upon us the mystery of things,
As if we were God's spies."

FLOWERS.

FROM A PAINTING BY VAN HUYSUM.

WHAT a desolate place would a world be without a flower! It would be a banquet without a welcome, a face without a smile, a firmament without a star. But, happily, such a world is not ours; and the love of flowers seems a naturally-implanted passion, without any alloy or debasing object as a motive. Truly, indeed, does Cowper say,—

> "That man, immured in cities, still retains
> His inborn, inextinguishable thirst

Of rural scenes, compensating his loss
By supplemental shifts, the best he may.
The most unfurnish'd with the means of life,
And they that never pass the brick-wall bounds,
To range the fields, and treat their lungs with air,
Yet feel the burning instinct; overhead
Suspend their crazy boxes, planted thick
And water'd duly. There the pitcher stands,
A fragment, and the spoutless teapot there;
Sad witnesses how close-pent man regrets
The country, with what ardour he contrives
A peep at nature, when he can no more."

If, in the long and sombre months of winter, our love of nature, like the buds of vegetation, seems cold and torpid, yet, like them, it unfolds and reanimates with the opening year, and we welcome our long-lost associates with a glowing cordiality, as friends in a foreign clime. And then, what a rich and varied succession is it ours to enjoy!—

"Fair-handed Spring embosoms every grace;
Throws out the snowdrop and the crocus first;
The daisy, primrose, violet darkly blue,
And polyanthus of unnumber'd dyes;
The yellow wall-flower, stain'd with iron-brown;
And lavish stock that scents the garden round:
From the soft wing of vernal breezes shed
Anemonies; auriculas enriched
With shining meal o'er all their velvet leaves;
And full ranunculus of glowing red.
Then comes the tulip race, where beauty plays
Her idle freaks:
No gradual bloom is wanting; from the bud,
First-born of spring, to summer's musky tribes:
Nor hyacinths of purest virgin white,
Low bent, and blushing inward; nor jonquils
Of potent fragrance; nor Narcissus fair,
As o'er the fabled fountain hanging still;
Nor broad carnations, nor gay spotted pinks;
Nor, shower'd from every bush, the damask rose,
Infinite numbers, delicacies, smells,
With hues on hues expression cannot paint,
The breath of nature, and her endless bloom."

No wonder, then, that in so many lands there has been the desire to picture to the eye these lovely objects. From time immemorial the Persians, the Chinese, and the Japanese have found in them the choicest ornaments for their varied fabrics. On the discovery of the new world, the Spaniards observed flowers painted or sculptured with taste, on the religious monuments of its people; and were astonished at finding that Europe had nothing compared with the flowers in silver and gold, that decorated the palaces of the Mexican kings. France, Italy, and Holland have produced artists who have achieved distinction as painters of flowers. Our engraving represents one of the most highly esteemed works of Van Huysum, an eminent Dutch artist; and his claim to honour will at once be admitted. He was born at Amsterdam, in 1682; he was educated under his father, an artist of considerable talent, but chiefly remarkable as a flower painter, to which department his son bent the whole force of his mind. Determined to commence by making fame his object rather than money, he spared neither time nor pains to render his works perfect. His flowers, plants, and their accompaniments are finished with a delicacy, polish, and accuracy that almost delude the sight; nor is the apparent freedom of his pencil affected by this height of finish. He had also methods of mixing his tints, and preserving the lustre of his colours which, with a jealousy unworthy a man of genius, he never would communicate. The beauty of his works was so conspicuous that they soon obtained high prices, and latterly, none but persons of opulence could purchase them. Besides his merits as a flower painter, he excelled in landscapes; his pictures in which line are well coloured, while each tree is distinguished by a tint peculiar to its leafing. He died in 1749. Nor should it be overlooked that England has not followed in the rear of floral representation, and that she has still artists, such as Lance, Bartholomew, and Hunt, of whose works any country or any age might well be proud.

The vase of flowers now exhibited reminds us of the fact, that many plants which, in a state of nature, never present more than a single row of petals, begin to assume several rows under continued cultivation. To what then is this change attributable? The effects of a richer soil, and other genial circumstances, or the mere accident of double petals in one plant transmitted with improvements through its progeny, are the common explanations; and these are generally received as satisfactory, without reflecting that what we call accident is itself a result of some cause, and that change of condition must attack some physiological principle before it can have any effect in modifying the character of a plant.

To explain the phenomenon of double flowers, we must make practice agree with theory. Every double plant is, in fact, a monstrous vegetable. It lies beyond the proper range of the botanist, and with it the florist has properly to do. To produce such an anomaly, we must attack the principle of the flower's creation,—that is to say, the seed; and how to do this experiment will declare. If, for example, after having gathered the seed of a ten weeks' stock, we sow them immediately, the greater number of the seedlings will produce *single* flowers; but if, on the contrary, we preserve these same seeds for three or four years, and then sow them, we shall find *double* flowers on nearly all the plants. It appears, therefore, that in keeping a seed for several years, we so weaken it, that the energy which would otherwise have been expended in producing stamens, yields petals. A still further proof of our position is, that plants in their wild state, shedding their seeds naturally, and sowing them as soon as they fall to the ground, even in a long succession of time, scarcely ever produce plants with double flowers.

Anomalous, however, as the botanist must regard the double flowers, we shall still feel our obligations to the florist who charms us with their beauty and fragrance; and to the artists whose pencils and gravers present them so vividly before us that we are disposed to exclaim,—

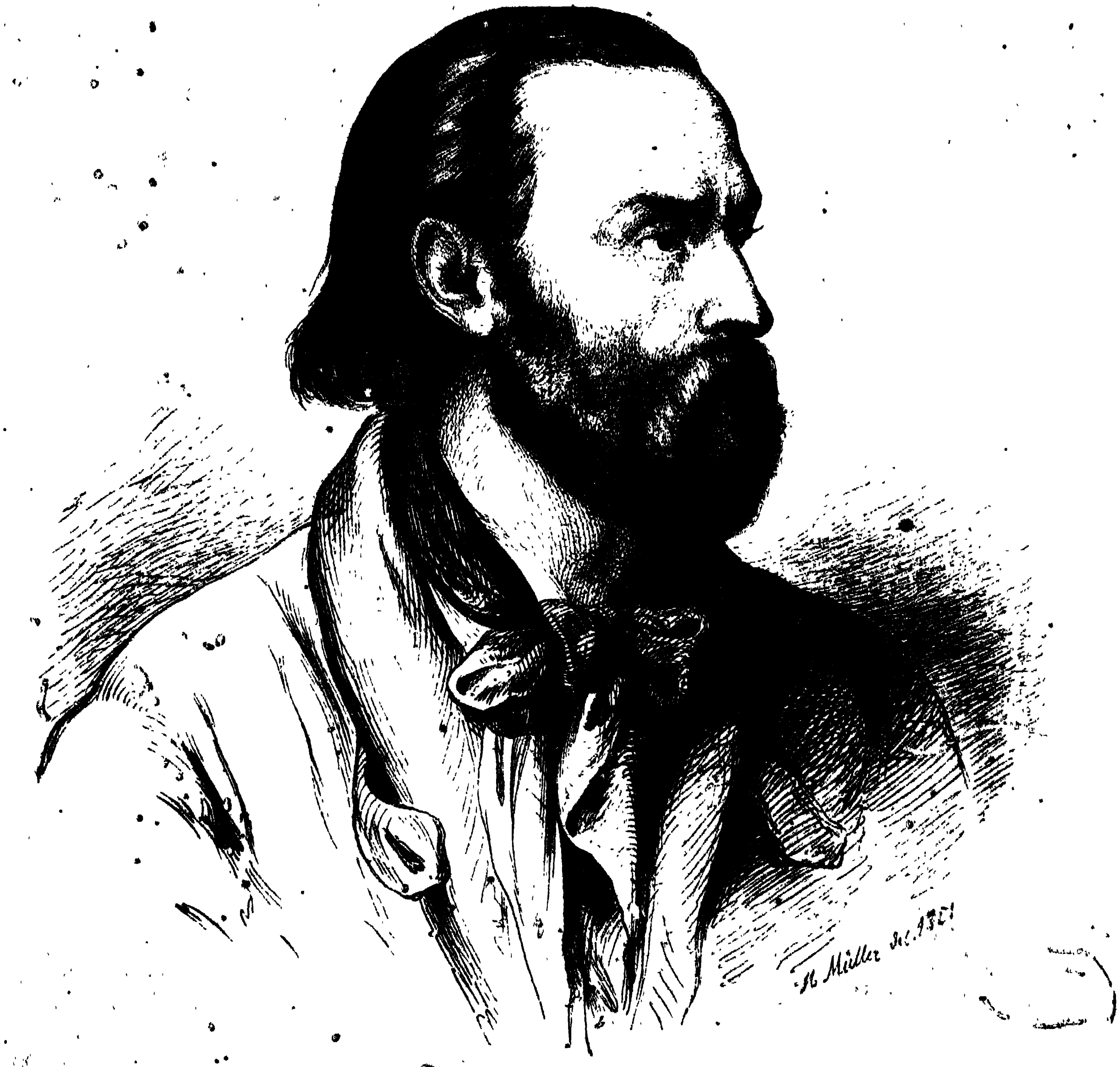
"Where are the flowers, the fair young flowers, that lately sprang and stood
In brighter light and softer airs, and beauteous sisterhood?
Alas! they all are in their graves, the gentle race of flowers
Are resting in their lonely beds, with the fair and good of ours:
The rain is falling where they lie, but the cold November rain
Calls not from out the gloomy earth the lovely ones again."

VEGETABLE IVORY.

THIS article, now much used for ornamental purposes, is the produce of a palm found on the banks of the Magdalena, in the republic of Columbia, South America. The Columbians call it *Tagua*, or Cabeza de Negro (negro's head), in allusion to the shape of the nut; and the term *vegetable ivory* is given to it by Europeans, from the close resemblance it bears, when polished, to the animal ivory of the elephant's tooth. The Spanish botanists, Ruiz and Pavon, give it the generic name of *phytelephas*, or elephant-plant, distinguishing two species, the *macrocarpa*, or large-fruited, and the *microcarpa*, or small-fruited. The Indians cover their cottages with the leaves of this most beautiful palm. The fruit at first contains a clear insipid fluid, by which travellers allay their thirst; afterwards the same liquid becomes milky and sweet, and changes its taste by degrees as it acquires solidity, till at last it is almost as hard as ivory. The liquor contained in the young fruits becomes acid, if they are cut from the tree and kept for some time. From the kernel the Indians fashion the knobs of walking-sticks, the reels of spindles, and little toys, which are whiter than ivory, and as hard, if they are not put under water; and if they are, they become hard and white again when dried. Bears devour the young fruit with avidity. The part of the kernel which is similar to ivory is of the same nature as the meat of the cocoa-nut; this kernel becomes very hard in several palm-trees, such as the date, but not of sufficient size to be of value to the turner. The *doum*, or forking palm of Thebes, the fruits of which are called ginger-bread nuts at Alexandria, has a similar albumen, which is turned into beads for rosaries; and that of the double cocoa-nut, or coco-de-mer, is also susceptible of a fine polish.

FREDERICK PRELLER.

This distinguished German artist was born at Eisenach, on the 25th of April, 1804. Shortly after his birth, his parents removed to Weimar; where, showing at an early age strong indications of a very decided talent for art, he was placed as a pupil in the public drawing-school. In this institution he enjoyed the instructions of Meyer, a man who was more distinguished as a practical artist, than for his intimate acquaintance with the principles of art itself. Under the judicious training of this kind and excellent teacher, young Preller's artistic talents were assiduously cultivated and rapidly developed.



DRAWN BY MÜLLER, AND ENGRAVED BY KRETZSCHMAR.

At the age of seventeen he went to Dresden, to acquire a wider and more varied acquaintance with art, by studying in the celebrated picture-gallery in that city. Here it was that he first gave evidence of his great talent for landscape-painting which the very favourable circumstances into which he was now thrown, enabled him to cultivate so successfully. After three years industrious application to this branch of art, the practical kindness of the grand duke, Charles Augustus, enabled him to remove to Antwerp, to study figure-painting in the academy in that city, under the direction of Bree. The paintings which he executed whilst here, were not more remarkable for their exquisite artistic finish, than for their perfectly truthful agreement in the minutest details of form and shade with their living originals. Before leaving Antwerp, he received two valuable prizes, at the yearly meeting of the members of the academy, in token of his great proficiency.

After a short visit to his home he went to Milan, in compliance with the wishes of his patron, the grand duke. But the chief wish of his heart was to visit Rome, which was at that time the common centre of attraction to aspiring artists all over Europe. This he was enabled to do in 1828. During the three years which he spent in Rome in the unremitting study and practice of his favourite pursuit, he acquired that perfect realisation of the peculiarly German idea of the reality of art, and especially of landscape-painting, which he had from the first perseveringly endeavoured to make his own. Still, on his return to Weimar, in 1831, his style was at first largely influenced by his Italian [illegible]. But he soon became alive to the mistake, and presented his northern landscapes free from the misplaced and incongruous attributes of southern scenery. By the same earnest and persevering efforts which are essential to the attainment of every object of a laudable ambition, he at last attained that peculiar purity of style, and perfect truthfulness to nature, which have raised him to the distinguished rank which he now occupies in German art. As a landscape and figure painter he has no superior, if an equal, in Germany at the present day.

In 1846 he was chosen an honorary member of the Academy of Art at Dresden, and in 1849 the grand duke of Weimar created him a knight of the Order of the Falcon.

MONEY AS AN AGENT OF CIVILISATION.

Man has been defined "a speaking animal," a "cooking animal;" he might also be defined a "tilling animal," a "dressing animal," a "bartering animal," a "business animal," a "progressive animal," and so forth. Instinct is marvellous in many of its operations,—but it makes no progress—it learns nothing. The beaver fells the tree that hangs over the river or stream, floats it down the current, to a suitable site for building, and then plants the stakes and erects the house. But if the timber do not chance to grow where there can be conveyance by water, if it must be sought for inland, the beaver does not make a contract with another animal to convey the building materials to the spot, and then give him in exchange articles which he may require, and which his own locality does not produce. The exchange of commodities is the work of the reasoning faculty, and shows that there is a great gulf fixed between man who walks erect, looks to heaven with a face reflecting the sunlight and the starlight, and is immortal, and the most sagacious of the lower animals. Trade is beyond the comprehension of the wisest monkey; neither the bee, the beaver, the dog, nor the horse, goes to market.

Man, on the other hand, in his rudest state soon learns the necessity of protecting property by some sort of law,—and the next step in his progress towards civilisation is the exchange of one kind of property for another. Barter is naturally the first form in which commerce is carried on. A man sees that he has more of one article than he requires for his own use, and that his neighbour has more of another than he requires; both agree to exchange a part. But this simple form of exchange is suited only to a society in a very primitive state, where the objects of exchange are few, and their value has not been definitely ascertained. Men soon feel the necessity of a *tertium quid*—some third commodity that will represent *value*, and may serve as a *medium of exchange*. The labour spent upon an article, and its scarcity, serve to indicate its value. Payments in kind are found inconvenient. A man expends a certain quantity of labour, for which he wants in return food and clothing for his family; but his employer has only corn, or cattle, which he must take in greater quantities than suits him. Hence inconvenience and loss. If he could get some article which is current as a medium of exchange, representing a certain value—whether of corn or anything else—with which he could go to the market and get what he pleased, a great advantage is gained,—a great step is made in social progress. Hence we find that money is *essential to civilisation*—it is the steam-power that impels the social machinery, and to which we are indebted for all its complicated operations and marvellous products.

Money removes at once all the difficulties of barter,—its clumsy, troublesome, and tedious proceedings, its uncertainties and blind guesses, by presenting a *standard of value* by which all commodities are measured, and have their exact *price* affixed. By representing a certain amount of labour, it leads to a division of employments, facilitates the operations of industry, and leads to the perfection of human skill. It may not be possible to find any article which will serve as an invariable standard of absolute value, for money itself, however precious the metal of which it is composed, must yield to the fluctuations of commerce, of which the present state of the gold market affords an example. We can only approximate to what is absolutely correct in this matter. But it answers the purpose sufficiently, in enabling the inhabitants of the earth to exchange its productions, so that human enjoyments may be, as far as possible, realised over the surface of the globe. In one country the most useful materials can be drawn from the bowels of the earth in unlimited abundance, while sterility reigns upon its surface; in another, the fruits of the soil teem in the richest profusion. By means of money the miner enjoys the best food and clothing which the earth produces in another hemisphere, and the dwellers in flat countries and fertile regions enjoy an ample supply of the precious metals for the raw materials of manufacturing industry, for currency and for ornament. Thus the division of labour, by the aid of an extended and active commerce, distributes over the world the advantages of soil, climate, and situation, obtained by experience and skill in each locality. Thus the modes by which industry becomes productive are endlessly multiplied and diversified; thus the grades of society are established, and the perpetual advance of civilisation secured.

In almost every age and country metals have been chiefly used as money. The Jews, the Egyptians, the Chinese, the Persians, the Greeks, the Romans, all used a metallic currency. From the earliest era of commerce to the present time, business has availed itself of this medium of exchange, though not excluding other articles, such as cowrie shells in parts of Africa, and paper in all highly civilised countries. Aristotle considered that the principal use of a metallic currency was, that its value was less fluctuating than that of other materials. On this account gold and silver became universally the recognised measures of value and mediums of exchange. In the earliest ages they were exchanged in bars, and valued by weight and fineness only. The same custom has prevailed to our own time in China, where there was no silver coinage; but the smallest payments, if not made in the copper *tchen* were effected by exchanging bits of silver, whose weight was ascertained by a little ivory balance on the principle of the steelyard. According to Davis, the Chinese affect much accuracy in the art of *assaying*, or testing the purity of the precious metals. The stamped ingots of silver in which their taxes are paid are required to contain 98 parts in 100 of pure silver. Yet at Canton an enormous trade in opium has been conducted entirely in Sycee silver, which has been found to contain so large an admixture of gold, that it bears a premium of 5 or 6 per cent for exportation to England. The assayers who allowed gold to pass for alloy in their silver, cannot be much relied on in detecting the presence of baser metals in their currency. "To obviate this difficulty, coinage was introduced, by which portions of gold, silver, and copper have been impressed with distinctive marks, denoting their character, and hence become current under certain denominations, according to their respective weight, fineness, and value. These coins have always been issued by the government of each country as a guarantee of their genuineness; and the counterfeiting of them has been punished as a serious offence against the state."

Coining was practised very early. Homer speaks of brass money as existing nearly twelve centuries before Christ. The invention of coin is ascribed to the Lydians, a commercial people, whose money was gold and silver. Phydon, tyrant of Argos, coined both, 869 B.C. Money was coined at Rome under Servius Tullius about 578 B.C. The most ancient known coins are Macedonian of the 5th century before Christ. Brass money only was in use at Rome till within 269 years of the Christian era, when Fabius Pictor coined silver; "a sign," says Dufresnoy, "that little correspondence was then held with the East, where gold and silver were in use long before." Gold was coined 206 years before Christ. Iron money was used in Sparta, and iron and tin in Great Britain. Julius Cæsar was the first who obtained the express permission of the senate to place his image on the coins; an honour which had till then been confined to the gods, or to departed heroes who had received divine honours.

The first coinage in England was under the Romans, at Colchester. English coin was of different shapes, square, oblong, and round, until the middle ages, when the round only was used. Groats were our largest silver currency till after the year 1351. Coin was made *sterling* in 1216; before which time rents were mostly paid in kind, and money was found only in the coffers of the barons. The first gold coins on certain record were struck by Henry III., A.D. 1257. Shillings were first coined in 1503.

crowns and half crowns in 1553. The first shilling was struck in 1500. In 1660 the copper coinage put an end to the circulation of private leaden pieces. Halfpence and farthings were first issued in 1665. Guineas were first coined by Charles II. in 1673, and these were followed by double-guineas, five guineas, and half-guineas. Quarter-guineas were coined by George I in 1718. Henry VIII. had coined sovereigns and half-sovereigns of the modern value, but the guineas were composed of finer gold, and passed for more. Gold coin was introduced in six-shilling pieces by Edward III. *Nobles* followed at 6s. 8d., and hence the lawyer's fee.

Queen Elizabeth coined £5,832,000, James I, £2,500,000, Charles I, £10,500,000, Cromwell, £1,000,000, Charles II, £7,524,000, James II, £3,740,000, William III, £10,511,900, Anne, £2,691,625, George I, £8,725,920, George II, £11,966,576, George III and the Regency, gold, £74,501,586, George IV, £11,782,816, William IV, £10,827,603.

In 1711 the coin of the realm was about 12 millions, in 1762 it was 16 millions, in 1786 it was estimated at 20 millions, and in 1800 it had reached 37 millions. In 1830 the Duke of Wellington stated that the gold was 28 millions, the rest of the metallic currency [illegible] millions, while paper largely supplied the place of coin. The English were ignorant of the art of coining till 1278, the Mint having been kept by Italians. The operators were formed into a corporation by the charter of Edward III., consisting of the warden, master, comptroller, assay-master, workers, coiners, &c. Between 180[illegible] and 1810 grants amounting to £26[illegible],000 were made by parliament for the present building. The new constitution of the Mint, founded on the report of Mr. Wellesley Pole, took effect in 1815. Burke, in his speech on economical reform in [illegible]0, proposed that the Mint should be abolished as a public establishment, and that the Bank of England should take charge of the business of coining. "The Mint," said that great man, "is a manufactory, and it is nothing else, and it ought to be undertaken on the principle of a manufactory; that is, for the best and cheapest execution, by a contract, upon proper securities, under proper regulations." By a provision in the Act of Union with Scotland, the establishment of the Mint was maintained for above a century after that event in Scotland, though all money was coined in England.

In almost all countries the coinage has been debased by the government; indeed, this was formerly a common artifice for increasing the revenue and robbing the subject. This was done by diminishing the quantity of metal of a standard fineness,—by raising the nominal value, and ordaining that the coins should pass at a higher rate, and by leaving them of the ordinary weight, but adding a large portion of alloy. In England, the debasements from the Conquest to the reign of Elizabeth amounted to [illegible]5 per cent on the whole; and in a period of 115 years, from 1 James I to 1 George I, the value of gold coins, as compared with silver coin, was artificially raised [illegible]9 per cent.

Our coinage not only fixes the weight and fineness of gold, but also the standard price of bullion. But this law cannot control the market. If the market price of gold remain for some time as it is now, considerably lower than that fixed in the Bank of England, the coin will be depreciated in value, and will pay for less, that is, the price of commodities will be nominally raised. On the other hand, if the market price of gold were higher than the standard price, sovereigns would be melted down in order to sell the metal for the profit that could thus be made.

Gold is the standard in England, silver on the continent. Ours is much more convenient. We can carry in a small purse what a Frenchman would be obliged to hire a conveyance for, to pay the same amount.

In the great operations of commerce, however, bargains are very rarely paid for in any coin whatever. They are conducted on a system of credit by means of paper,—either the "promissory notes" of the banks, or the bills of exchange which the banks discount. It is for the smaller transactions only—the innumerable bargains of daily life among the busy masses—that a metallic currency is needed.

* The Rothschilds and other great millionaires lend millions of money to carry on wars, feed armies, and pay debts, by signing their names on scraps of paper.

VELOCITY AND MAGNITUDE OF WAVES.

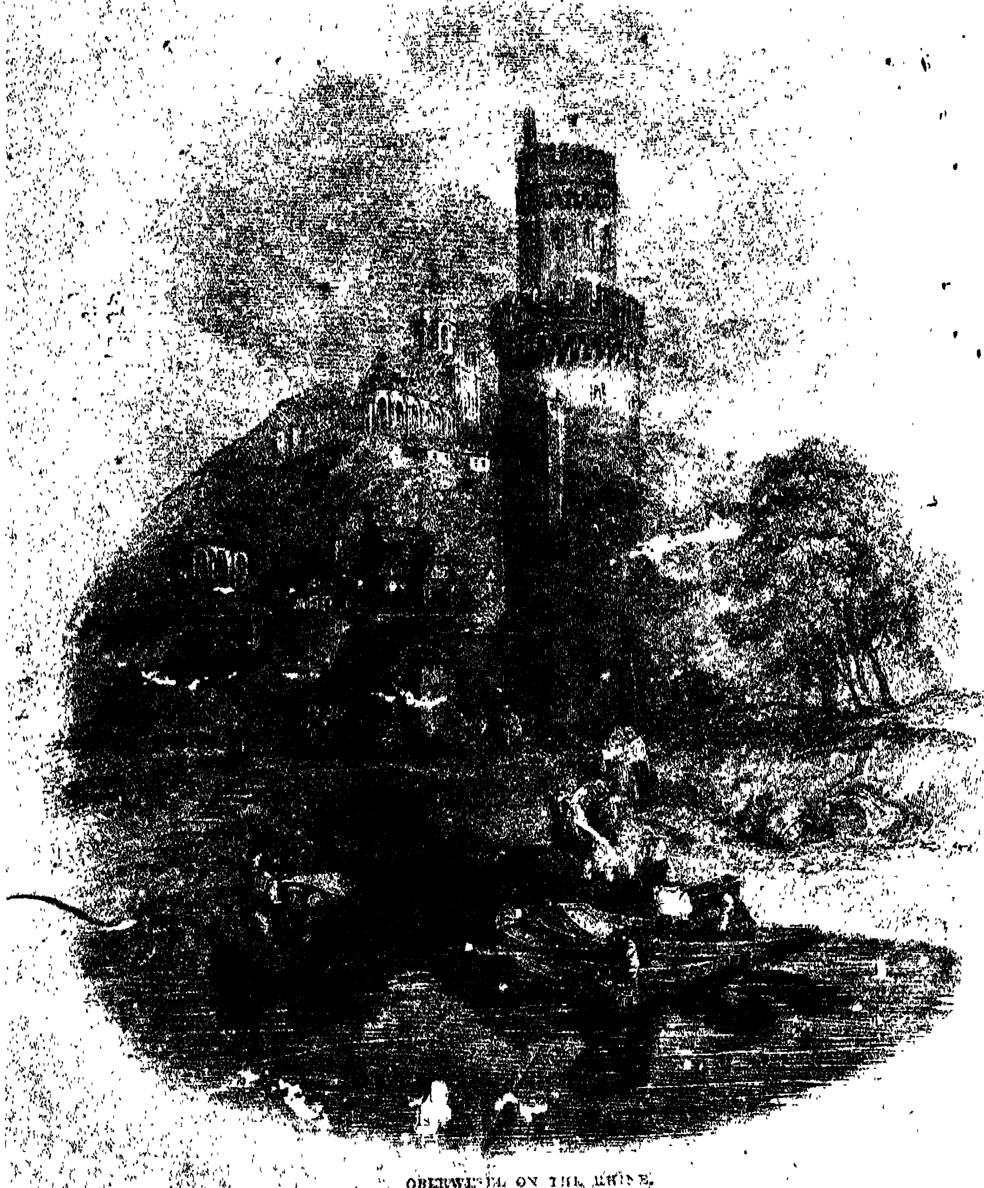
The velocity of waves has relation to their magnitude. Some large waves proceed at the rate of from thirty to forty miles an hour. It is a vulgar belief that the water itself advances with the speed of the wave, but in fact the *form* only advances, while the *substance*, except a little spray above, remains rising and falling in the same place, according to the laws of the pendulum. A wave of water, in this respect, is exactly imitated by the wave running along a stretched rope when one end of it is shaken; or by the mimic waves of our theatres, which are generally the undulations of long pieces of carpet, moved by attendants. But when a wave reaches a shallow bank or beach, the water becomes really progressive, because then, as it cannot sink directly downwards, it falls over and forwards, seeking its level. So awful is the spectacle of a storm at sea, that it is generally viewed through a medium which biases the judgment; and, lofty as waves really are, imagination makes them loftier still. No wave rises more than ten feet above the ordinary level, which, with the ten feet that its surface afterwards descends below this, gives twenty feet for the whole height, from the bottom of any water-valley to the summit. This proposition is easily proved by trying the height upon a ship's mast at which the horizon is always in sight over the tops of the waves, allowance being made for accidental inclinations of the vessel, and for her sinking in the water too much below her water-line at the instant when she reaches the bottom of the hollow between two waves. The spray of the sea, driven along by the violence of the wind, is of course much higher than the summit of the liquid wave, and a wave coming against an obstacle, may dash to almost any elevation above it. At the Eddystone Lighthouse, when a surge reaches it, which has been growing under a storm all the way across the Atlantic, it dashes even over the lantern at the summit.

OBERWESEL.

In descending the Rhine between Kaub and the Pfalzgrafenstein, the towers of Wesel are seen rising from a dark and rocky background, and above them the commanding ruins of the castle of Schönberg. This fortress was built by the Lords of Schönberg, who were all powerful during the middle ages in Wesel, and in the last centuries, under the title of Counts of Schomberg, were created grandees of Portugal, and peers of England, for their military deeds. The romantic spirit of the inhabitants of the Rhineland, however, derived the name of the castle from seven beautiful ladies who once inhabited it, and are said to have captivated every one who beheld them by their charms. On account of their vanity, these seven noble ladies are said to have been transformed into the seven pointed rocks which, at low water, are seen just below Wesel, and are called by the boatmen the "seven sisters." The tradition further says that, if these seven rocks were raised from the river-bed, and used to build a chapel, the "seven sisters" would be freed from the enchantment which at present enchains them. The situation of Oberwesel is one of the most romantic, and, to judge from the number of artists who visit it, picturesque parts of the Rhine valley. Above and below the town two green vine-covered valleys run into the hills, enclosing between them the old-fashioned buildings, the sombre, turrets, tall spires, and quaint towers of Oberwesel. The churches are worthy of observation, especially the slender spire of the Church of our Lady, which attracts the attention of every passer by, by its singularly shaped tower. The interior of this church is most interesting to the antiquarian, the richly ornamented *lectorium*, and the carved altar, with its folding doors, in which designs are executed with a sharpness and beauty such as is even seldom seen in stone. Not far from this church stands the old gate, but the road no longer leads through its grey walls into the town. At the opposite end is a tower such as we find at Andernach; the most extensive view is, however, to be obtained from the church of St. Martin. The small old church which is built into the wall, is said to have been dedicated to the memory of some children who were supposed to have suffered martyrdom at the hands of the Jews. Another curiosity of Oberwesel, and one which all visitors are taken to inspect, is the footprint of St.

Hubert's horse in the market-place, although tradition does not state the manner in which it became so impressed in the pavement.

Oberwesel was for a long time under the rule of the Counts of Arnstein, but when that family became extinct, on the death of Ludwig III., in the monastery which bears his name, it, with his other possessions, fell to the Schönbergs. It did not, however, remain long in their hands, for, after some very arbitrary and tyrannical measures toward the inhabitants, Frederick II. placed the townships under the protection of the empire. As one of the most powerful imperial cities of the Rhine, its prosperity dates from this time, and the neighbouring Counts of Katzenellenbogen considered it an honour to be called citizens of Oberwesel. Under the reign of Heinrich VII., however, this prosperity began to be on the wane, for the Emperor pledged Wesel and Boppard to his brother Balduin of Treves, which reduced both to the rank of market-towns. It was certainly not without a struggle that the people of Wesel submitted to this new yoke, but they soon discovered that they were powerless in the hands of the stern Balduin and the fiery Kuno of Falkenstein. Under his successor Werner, they, however, opposed force to force, and founded their protest against the bishop's encroachments on the privileges granted by Frederick II. An obstinate struggle followed, in which they were compelled to acknowledge the supremacy of Treves, but nevertheless gained an acknowledgment of their privileges and municipal charter.



OBERWESEL ON THE RHINE.

Not far below Oberwesel is the celebrated Lurlei Rock, the Scylla and Charybdis of the Rhine, which has furnished the subject for many a page of German romance or traditionary ballad.

END OF VOLUME II.